

**United States Military Academy  
West Point, New York 10996**

**A DATA WAREHOUSE TO SUPPORT  
CONDITION BASED MAINTENANCE (CBM)**

**OPERATIONS RESEARCH CENTER OF EXCELLENCE  
TECHNICAL REPORT DSE-TR-0509  
DTIC #: ADA434357**

Lead Analysts  
**Major Steven J. Henderson, MS**  
Analyst, Operations Research Center

Senior Investigator  
**Lieutenant Colonel Michael J. Kwinn, Jr. PhD**  
Associate Professor and Director, Operations Research Center of Excellence

Directed by  
**Lieutenant Colonel Michael J. Kwinn, Jr. PhD**  
Associate Professor and Director, Operations Research Center of Excellence

Approved by  
**Colonel Michael L. McGinnis, Ph.D.**  
Professor and Head, Department of Systems Engineering

**May 2005**

The Operations Research Center is supported by the Assistant Secretary of the Army  
(Financial Management & Comptroller)

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## **Abstract**

The United States Army's legacy maintenance strategy for its helicopter fleet is centered on replacing and repairing components based on aircraft hours flown. This strategy overlooks how variations in environmental conditions, component stresses, and other exogenous factors effect the lifetime of specific components across the entire fleet of Army Aviation Aircraft. This report describes the design and implementation of a data warehouse that subsumes many disparate databases currently housing information about these factors. This data warehouse supports a common synchronized "maintenance picture" that includes state, health, usage, and logistics data for any component on any helicopter in the fleet. This view enables researchers and planners to individually manage component maintenance according to a "condition based" policy. This report discusses a systems engineering approach to creating a data warehouse including logical and physical designs, data management strategies, and an implementation plan. Discussion is also included detailing how the warehouse might be adopted for conditioned-based maintenance of all Army systems.

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# **1. Introduction**

## **1.1 Background**

The United State Army's current maintenance regimen for its fleet of helicopters consists of two main components – scheduled maintenance activities and unscheduled maintenance activities. Scheduled maintenance activities are largely preventive, and involve periodic inspection, servicing, replacement and overhaul of various aircraft components. These scheduled maintenance actions are managed in large part according to how long a particular component has operated (measured in aircraft hours flown).

Unscheduled maintenance activities consist of actions taken to correct unplanned faults and failures. Many unscheduled maintenance actions occur as a result of scheduled maintenance actions, though some are reported as degraded system performance by the helicopter's crew.

Arguably, this maintenance system has fared well for decades in maintaining a safe and ready aviation fleet. In a five year period, just one in five Army Aviation accidents was attributable to component failure [1]. However, many believe the advent of sophisticated on-board health monitoring systems and modern data collection capabilities has prompted for a redesign of the current maintenance system.

Potential improvements lie in overhauling sweeping assumptions that the legacy maintenance system makes about how components wear. Current maintenance models presume that a component's condition is mainly a function of age, and ignore such exogenous factors as environmental conditions, how the aircraft flies (usage), manufacturing variances, or preventive maintenance history.

The Army's time-based approach to component aging is incredibly wasteful given the high degree of variance inherent in the operation of Army aircraft. For example, a transmission flown at a quadruple operations tempo in a desert environment at maximum gross aircraft weight is maintained the same as a transmission flown under light load conditions at a training facility in the Southeast United States. Treating such components with a universal maintenance model can lead to premature and superfluous maintenance actions and waste money, materials, and time.

The Army is considering transitioning its existing maintenance management regimen to a Condition Based Maintenance (CBM) strategy. The CBM approach leverages all relevant

information to manage each individual aircraft component throughout its specific lifetime. This new system will incorporate data from a plethora of disparate sources including usage, environment, vibration, and component state data. This will aid in the development of high-fidelity diagnostic and prognostic models for monitoring component health and predicting component failure. Indeed, recent reliability efforts have shown promise in the area of condition based prognostics and diagnostics. McDowell and the Multi-University Center for Integrated Diagnostics have pioneered much work in this area [2]. Likewise, the U.S. Navy maintains an official and fairly mature condition based maintenance program for much of its surface and submarine fleet [3][4].

The goal of CBM is to eliminate unscheduled maintenance and improve scheduled maintenance activities. By leveraging real-time diagnostics and incorporating prognostics many unscheduled maintenance events will move into the realm of scheduled maintenance. In turn, maintenance personnel will order replacement components weeks in advance, reducing priority transportation and shipping costs. A CBM system will also allow maintainers to improve scheduled maintenance activities. Instead of a single maintenance schedule for the entire fleet, maintainers can develop, track, and integrate specific scheduled maintenance actions for each component on each aircraft [5].

This CBM approach is highly reliant on a common, synchronized, and high-fidelity information system. This system must include all relevant data sources from any aspect of a component's life. Currently, such a system does not exist. The incumbent maintenance system does feature many important wellsprings of maintenance information. However, each of these data sources was developed for a specific purpose, and each has its own way of representing various aspects of the maintenance domain. These data subsystems have very different and inconsistent data definitions, data relationships, and data transformation rules.

## **1.2 Operational Need**

What is needed is a common and freely available data warehouse that not only subsumes these existing data sources, but also accommodates any relevant data source from a component's life. This data warehouse will provide a comprehensive picture of all relevant information about the life of a component, and assist analyst, engineers, and managers with making the transition to condition based maintenance.

This report focuses on the design of such a data warehouse to support a CBM Prototype. The CBM Prototype is an initial effort that demonstrates and explores the capabilities of the CBM concept. This prototype includes two primary research efforts. The first effort focuses on the engineering and reliability analysis necessary to realize CBM. The second effort, and the focus of our work, examines the data warehouse needed to support this analytical effort.

### **1.3 Design Methodology**

In an effort to inject process into the development of the data warehouse, we must first adopt an effective systems engineering methodology. A systems engineering methodology represents a systematic way of decomposing a high-level need into a set of well defined requirements and accompanying designs to satisfy these requirements. Many such processes are described and compared in [6]. We will select and apply a modification of a systems engineering methodology known as the Systems Engineering and Management Process (SEMP) in order to address development of the prototype data warehouse. This process, developed at the United States Military Academy, helps engineers systematically design large-scale, complex systems to address problems [7]. The SEMP methodology satisfies the seven fundamental activities required in an effective systems engineering approach as defined by [6], and has been applied to hundreds of civil and military applications.

Our modified SEMP approach involves three phases - Problem Definition, Design and Analysis, and Implementation. In the Problem Definition Phase, we review stakeholders, their requirements, and perform a complete systems decomposition of the CBM Prototype Data Warehouse. In the Design & Analysis Phase, we construct and analyze a logical and physical design for the prototype, as well as define a data management plan. In the Implementation Phase, we suggest a project plan for implementing our design.

This process is modified from the original SEMP in that it (a) does not generate more than one alternative for the data warehouse, (b) does not involve a decision making process, and (c) does not implement and control the design. These steps were omitted in order to speed rapid development of the prototype.

## 2. Problem Definition

### 2.1 Needs Analysis

Our first step in defining the data model is to conduct a thorough Needs Analysis of the CBM prototype. A Needs Analysis is a systems engineering process where we scope and bound the system under study and gather important stakeholder requirements. This process allows for creation of alternatives that are within the project scope while satisfying stakeholder requirements.

Needs Analysis begins with a definition of an initial problem statement. The initial problem statement for the CBM Prototype is paraphrased as:

*Develop an information system that combines state, vibration, and maintenance data into a common maintenance picture for the UH60, AH64, and CH47 fleet of aircraft. Provide maintenance information to major stakeholders that enables Condition Based Maintenance [8].*

Figure 1 shows a diagram of the desired information system. The left hand side of the diagram lists the incoming data sources for the CBM Prototype. Each of these sources represents an existing maintenance management subsystem currently used in the Army. The right hand side of the diagram shows stakeholders involved with the CBM Prototype.

### 2.2 Stakeholder Analysis

Before designing the data warehouse, we need to understand the requirements of relevant stakeholders who will use the CBM Prototype. In order to accomplish this, we conduct several interviews and meetings that target a variety of stakeholders representing four groups – analyst, managers, sponsors, and decision makers. Each of these relevant stake holders is described below [5].

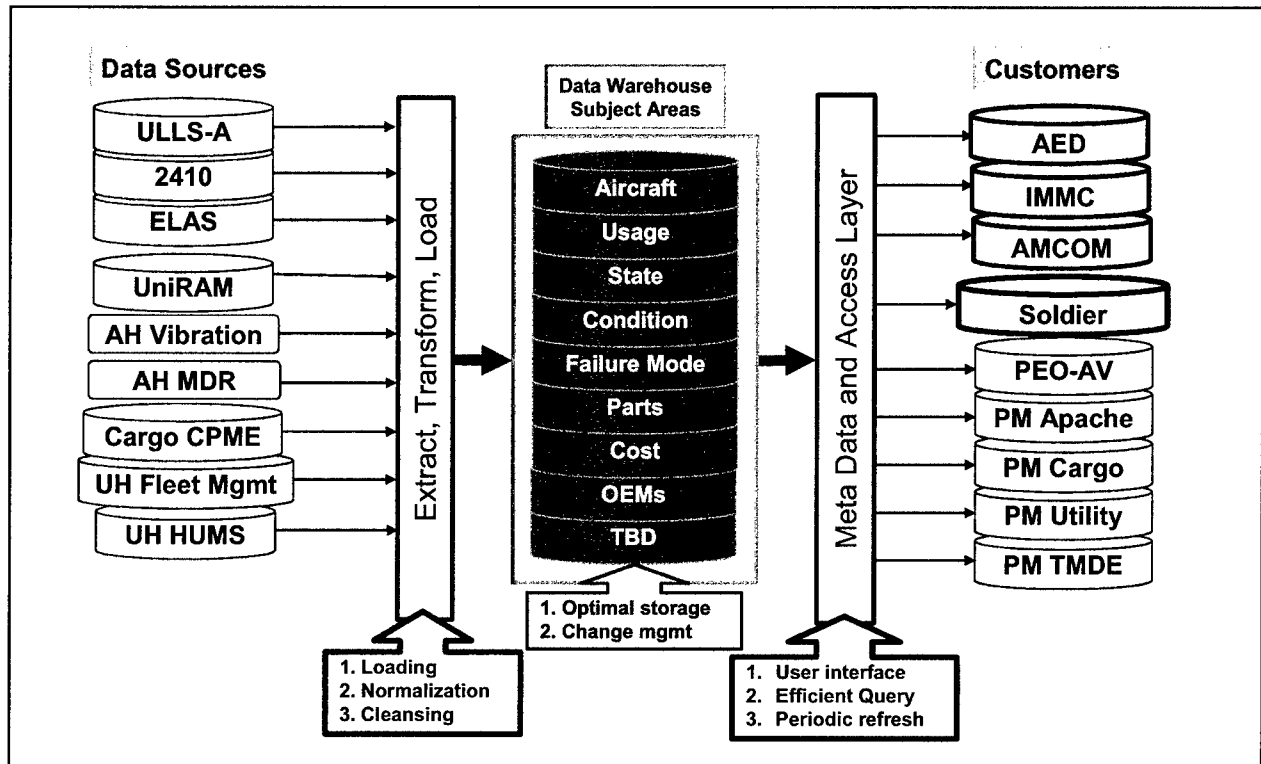


Figure 1 - The CBM Prototype Data Warehouse

*Army Soldiers and Units.* Soldiers in the field are the prime benefactors of the CBM Prototype. Because they serve as front line implementers of maintenance policy, they will also serve as important users of any CBM Prototype.

*Aviation Engineering Directorate (AED).* AED serves as the airworthiness authority for Army aircraft. This agency represents the active engineering effort for Army Aviation. They are responsible for researching and analyzing readiness, availability, and maintainability data to establish safety and logistical management policy. They will use the CBM Prototype in execution of these duties.

*Integrated Material Management Center (IMMC).* IMMC partners with Project Executive Officers and Program Managers, war fighters, and industry to develop, acquire, field, and sustain worldwide logistics support to ensure weapon system readiness in any operation. They are

largely a clearing house of information used by maintenance managers and decision makers. The CBM Prototype will help them provide this information.

*Aviation Missile Command (AMCOM).* AMCOM is the parent agency of AED, and serves as the overall proponent for development of the CBM Prototype.

*Program Executive Office Aviation (PEO-Aviation).* PEO-Aviation is overall responsible for management of all Army helicopter systems. Their stake in the CBM Prototype centers on managing the components affected by CBM policy. They are also responsible for the systems and sensors that collect CBM data.

*Program Managers (PM).* The Program Managers are the individual offices responsible for a specific type of helicopter (AH64, UH60, etc).

During this interview process, we ask each stakeholder a list of questions targeting functional requirements, data scope, data granularity, information latency, required data sources, and existing analytical tools and products. An example interview outline is shown at Appendix A. We next identify over thirty use cases for the CBM prototype from this stakeholder interview process. These use cases document individual stakeholder needs, wants, and desires. A sample of the use cases is shown in Figure 2. Complete use case documentation is available at Appendix B. An analysis of these use cases yields the following collective needs, wants, and desires of the stakeholders:

- (1) For any given component, provide a complete and synchronized view of all possible diagnostic data at any point in that component's life. Show trending of this information along scalable trajectories.
- (2) Produce reliability trending for any of the following populations: individual component, component family, aircraft, major aircraft system, unit, geographical location.
- (3) View the maintenance history of a particular component or component family juxtaposed with reliability information as well as usage and component state information.



(4) For a given component, show a history of its reliability information matched with component configuration and location.

(5) For a given component or aircraft, provide a complete maintenance history including front-line maintenance activity, component installation records, tear down analysis, and fault history.

## 2.3 System Decomposition

In an effort to scope and bound the data model, we next conduct a detailed system decomposition of the CBM Prototype. To accomplish this we must clearly understand what is meant by system. Because the CBM Prototype will include information from the data sources shown in Figure 1, we know that any resultant system must subsume these individual source data schemas. Each of these data sources is briefly introduced below.

### 2.3.1 Data Source Overview

*Unit Level Logistics System Aviation (ULLS-A).* ULLS-A is a unit-based information system that tracks individual aircraft maintenance actions. These maintenance actions describe (in a detailed text-based fashion) the history of all maintenance activities that occur at the unit level. This includes repairs, replacements, and troubleshooting. It does not include major component tear down, overhaul, or detailed failure analysis.

*Department of the Army DA Form 2410 Data (2410 Data).* The 2410 data describes major component replacements and repairs for certain tracked components. These components are usually major end items with a high dollar value.

*Enhanced Electronic Logbook Automation System (ELAS).* The ELAS is an information system that tracks individual maintenance actions. It is similar to ULLS-A, but primarily fielded for the AH64.

|   |  |
|---|--|
| <b>Stakeholder :</b> Martini, Joe<br><b>Stakeholder Type:</b> Engineer, Manager<br><b>Organization :</b> AED Structures & Materials |  |
| <b>Use-Case ID:</b>   | UC-15  |
| <b>Use-Case Title:</b>  | Predict time or conditions for failure   |
| <b>Priority:</b>  | Will Need Eventually   |
| <b>Frequency of Use:</b>  | Constantly   |
| <b>Primary Actor:</b>   | Analyst  |
| <b>Other Actors:</b>  | Analytical Tools Units in the field Aircraft   |
| <b>Pre-Conditions:</b>  | Aircraft failures in the field are known. Conditions the aircraft where flown in are known.  |
| <b>Main Success Scenario</b>  | 1. Analyst enters aircraft type or tail number. 2. Analytical tool mines the database for aircraft history, conditions flown, reliability models, and past failure histories 3. Tool issues a prediction to the analyst as to when the aircraft, or fleet of aircraft will fail. |
| <b>Variations</b>   | The analyst may also be interested in individual component failure.  |
| <b>Post-Conditions:</b>   | Analyst receives either an estimated time, or set of conditions when the aircraft will experience failure.   |
| <b>Data sources currently used to meet this requirement:</b>  | Qualification Data, 2410, ELAS   |
| <b>Software currently used</b>  | Excel, INCODE, VDRI  |
| <b>Additional Comments:</b>   | None   |

Figure 2 - Example CBM Prototype Use Case

*Unified Readiness, Availability, and Maintainability Data (UniRAM).* UniRAM data is highly cleansed ELAS and ULLS-A data. This data cleaning insures the mostly text-based and manually entered entries in ELAS and ULLS-A are correct and complete.

*AH Vibration Data.* AH Vibration data consist of vibration measurements calculated in flight for the AH64A/D aircraft by the Vibration Monitoring Enhancement Program (VMEP). The VMEP is an onboard health monitoring system that provides vibration condition indications for dozens of components [9].

*AH Maintenance Data Recorder (AH MDR).* The data recorder for the AH64A/D aircraft captures state data from hundreds of onboard sensors on the aircraft. These sensors collect information about a variety of aircraft components at a rate of approximately 16Hz. This data includes everything from pilot stick position to aircraft velocity in three axes.

*Cargo CPME.* Cargo CPME data includes maintenance management information from the CH47 [10].

*UH Fleet Management Data (UH Platform Maintenance Environment).* The UH60 Platform Maintenance Environment (PME) includes maintenance management information for the UH60 series of aircraft. This information is similar to the ULLS-A and ELAS datasets.

*UH60 Health and Usage Monitoring System data (UH HUMS).* UH HUMS tracks state and health monitoring data for hundreds of components on the UH60. It is analogous to the AH MDR and VMEP dataset for the AH64.

### 2.3.2 Individual Data Source Analysis

At the time of this writing, the scope of the CBM prototype and programmatic decisions limited the number of data sources available for analysis. Therefore, in this section, we will only

analyze those data sources that were (a) designated part of the CBM prototype and (b) were readily available for source data analysis and review. This set includes AH64 MDR, VMEP, and ELAS data. However, it is important to note that, despite this restricted data set, our design is a holistic systems engineering approach that will easily accommodate any of the data sources listed in Section 2.3.1.

#### 2.3.2.1 Analysis of AH64D Maintenance Data Recorder (MDR) Data

##### MDR Overview

The AH64D Maintenance Data Recorder is a digital source collector (DSC) that measures hundreds of parameters for the AH64D aircraft. On board sensors measure recorded parameters and report parameter values using the AH64D MIL STD-1553B Bus protocol. The MDR system was primarily designed to record maintenance exceedences and safety information for aircraft crash investigation purposes.

The MDR system generates a series of recordings for each MDR usage period. A MDR usage period corresponds to a single flight or ground run-up of the aircraft. A MDR usage period is created each time the aircraft has AC power. AC power is generated by the aircraft generators (powered by either the aircraft's auxiliary power unit or aircraft transmission in flight) or an external ground power unit.

##### MDR Parameters

Data recorded by the MDR includes component state monitoring (pressure, temperature, speed, etc), aircraft usage parameters (how the aircraft was employed), and crew information (cockpit voice recordings, switch positions, pilot inputs). These parameters are dynamically recorded based on a set of on-change triggers, and are not necessarily continuous in nature. For example, if the engine temperature experiences a change of more than 10 degrees Celsius, then the new value is logged. If there is a change of less than 10 degrees Celsius, then no value is recorded. Appendix C lists the entire set of MDR parameters including parameter definition, units, and triggering information.

### MDR Data Management

MDR data is managed according to a Boeing proprietary data management process, and was not originally designed to support export to third-party applications. Data from individual aircraft usage periods is stored in onboard data stores, then downloaded by technicians using the LIMSSGAS system. This system is a stand alone data viewer that enables maintenance technicians to view state trajectories and other information provided by the MDR. Data can be exported from LIMSSGAS, but the resultant files are stored in binary format intended to be used by other Boeing products.

In order to translate the MDR data into text that can be read by third-party applications (such as Excel or Matlab), one must use a Boeing-developed proprietary translation tool called MAST. MAST produces a comma separated values (CSV) text file that can be imported into any number of third-part applications.

### MDR Schema

Figure 3 shows an extract of the CSV file produced by MAST. As this figure shows, it is a simple one-table data schema listing the date time group (DTG) of a parameter recording, the name of the parameter recorded, and the recorded parameter's value. As previously mentioned, parameters are recorded as they individually change, surpass individual triggers, and report information to the central MIL STD -1553B bus controller. This results in a first changed/first logged chronological order of recorded MDR parameters. Because of the variance of individual component triggers, some parameters are logged frequently (several times a second) while others are logged only one or two times per flight. It is important to note that, as shown in Figure 3, often times a DTG is repeated several times for different parameters that each triggered a recording at the same time.

| Gmt_Time               | Parameter                   | Value    | Units             |
|------------------------|-----------------------------|----------|-------------------|
| 11/21/2004-22:17:33.24 | 0000 - Undefined Fault Code | 0        | Inactive Fault    |
| 11/21/2004-22:17:33.24 | 0000 - Undefined WCA Code   | 0        | Inactive WCA      |
| 11/21/2004-22:17:33.24 | Stabilator Position         | 0.263672 | Degrees           |
| 11/21/2004-22:17:33.24 | True Heading                | 0        | Semicircle        |
| 11/21/2004-22:17:33.24 | Primary Hydraulic Pressure  | 2938.25  | PSIG              |
| 11/21/2004-22:17:33.24 | Utility Hydraulic Pressure  | 2956.08  | PSIG              |
| 11/21/2004-22:17:33.24 | Emer (ACCUM) Hyd Pressure   | 2881.197 | PSIG              |
| 11/21/2004-22:17:33.24 | Total True Airspeed         | 0        | Knots             |
| 11/21/2004-22:17:33.24 | Pylon 1 PAC Position        | 0        | Degrees           |
| 11/21/2004-22:17:33.24 | Engine #1 NGRBX Oil Press   | 0.683928 | PSIG              |
| 11/21/2004-22:17:33.24 | Engine #1 Oil Pressure      | 1        | PSI               |
| 11/21/2004-22:17:33.24 | Eng 1 Bleed Air PRSOV Open  | 0        | 0=Closed 1=Open   |
| .                      | .                           | .        | .                 |
| .                      | .                           | .        | .                 |
| .                      | .                           | .        | .                 |
| .                      | .                           | .        | .                 |
| 11/21/2004-22:17:33.56 | Primary Hydraulic Pressure  | 2938.25  | PSIG              |
| 11/21/2004-22:17:33.56 | Utility Hydraulic Pressure  | 2952.514 | PSIG              |
| 11/21/2004-22:17:33.56 | Emer (ACCUM) Hyd Pressure   | 2899.026 | PSIG              |
| 11/21/2004-22:17:33.56 | IAFS Fuel Quantity          | 0        | Pounds            |
| 11/21/2004-22:17:33.72 | Altitude AGL (RADAR)        | 4.187308 | Feet              |
| 11/21/2004-22:17:33.72 | Radar Altitude Valid        | 1        | 0=Invalid 1=Valid |
| 11/21/2004-22:17:33.72 | Altitude Hold               | 0        | 0=Off 1=On        |
| 11/21/2004-22:17:33.88 | Altitude AGL (RADAR)        | 2.093654 | Feet              |
| 11/21/2004-22:17:33.88 | Radar Altitude Valid        | 1        | 0=Invalid 1=Valid |
| 11/21/2004-22:17:33.88 | Altitude Hold               | 0        | 0=Off 1=On        |
| 11/21/2004-22:17:33.88 | Hover Hold Mode             | 0        | 0=Off 1=On        |
| 11/21/2004-22:17:33.88 | Attitude Hold               | 0        | 0=Off 1=On        |
| 11/21/2004-22:17:33.88 | Lateral Airspeed            | -5.2887  | Knots             |
| 11/21/2004-22:17:33.88 | Side Slip Angle             | -16.8915 | Degrees           |
| 11/21/2004-22:17:33.88 | Lateral TAS Unfiltered      | -5.2887  | Knots             |
| 11/21/2004-22:17:34.04 | Side Slip Angle             | -19.3854 | Degrees           |

Figure 3 - Example MAST Output

## MDR Analysis

We performed two main tasks during analysis of the MDR data. In our first data analysis task, we designed a simple data transformation tool that transposes each MDR parameter onto a common timeline. This tool, created in Microsoft Access, uses a Visual Basic for Application (VBA) code sequence to import the original MAST-generated CSV and then create a single output table in DBASE IV format. The DBASE IV format can then be read by third-party applications such as Excel, Matlab, or Minitab. Figure 4 shows a screen shot of the user interface for this tool.

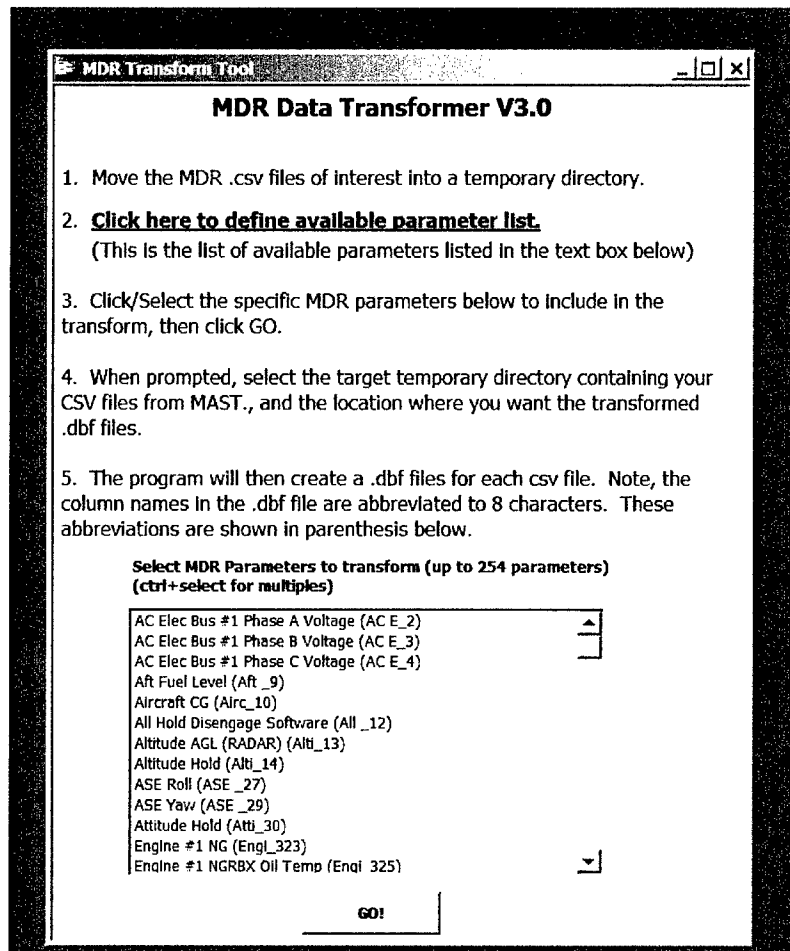


Figure 4 - Screen Shot of MDR Transform Tool

Each unique DTG in the source CSV corresponds to a single row in the resultant DBASE VI table. For each row, we add a column for up to 255 possible MDR parameters of interest selectable by the analyst or engineer (Figure 4). If a parameter triggered a recording at that row's DTG, then the new parameter value is inserted into the parameter's column. If no value

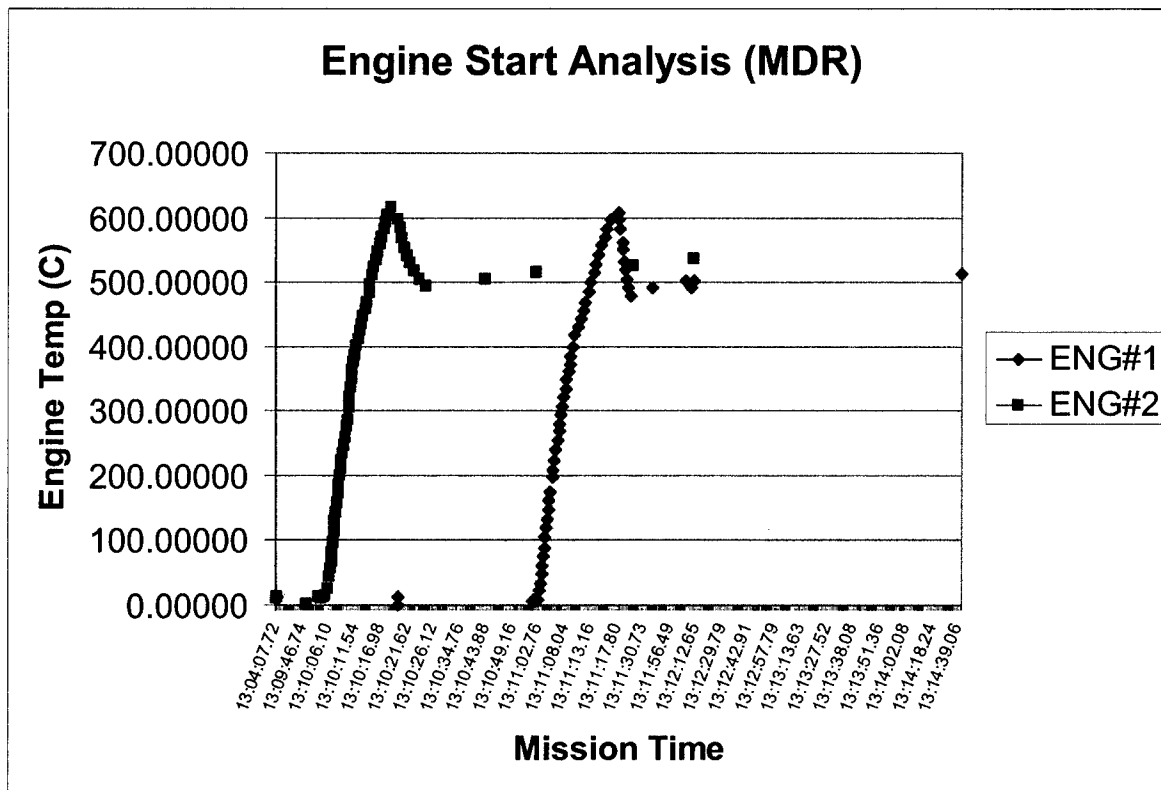
was recorded for a parameter at the row's DTG, then a null value is inserted. Figure 5 shows an extract of the table produced by this tool. This figure shows one common mission timeline, with any corresponding data recorded during each time interval.

| DTG                    | ENG#1 TGT | ENG#2 TGT |
|------------------------|-----------|-----------|
| 11/17/2004-13:04:07.72 | 11.23596  | 11.23596  |
| 11/17/2004-13:04:08.04 | 11.72447  | 11.72447  |
| 11/17/2004-13:04:11.72 |           |           |
| 11/17/2004-13:04:15.06 |           |           |
| 11/17/2004-13:09:47.54 |           | 1.46556   |
| 11/17/2004-13:09:47.70 |           |           |
| 11/17/2004-13:09:48.02 |           |           |
| 11/17/2004-13:09:58.58 |           | 11.72447  |
| 11/17/2004-13:09:59.54 |           | 12.21299  |
| 11/17/2004-13:09:59.70 |           | 10.74744  |
| 11/17/2004-13:09:59.86 |           | 11.72447  |
| 11/17/2004-13:10:00.98 |           | 12.70151  |
| 11/17/2004-13:10:01.14 |           |           |
| 11/17/2004-13:10:02.42 |           | 12.21299  |
| 11/17/2004-13:10:03.70 |           | 14.16707  |
| 11/17/2004-13:10:05.14 |           |           |
| 11/17/2004-13:10:05.94 |           | 24.42599  |
| 11/17/2004-13:10:06.10 |           |           |
| 11/17/2004-13:10:06.26 |           | 43.47826  |
| 11/17/2004-13:10:06.42 |           | 56.17978  |
| 11/17/2004-13:10:06.58 |           | 67.41573  |
| 11/17/2004-13:10:06.74 |           | 82.55984  |
| 11/17/2004-13:10:06.90 |           | 97.70396  |
| 11/17/2004-13:10:07.06 |           | 113.82511 |
| 11/17/2004-13:10:07.22 |           | 129.45774 |
| 11/17/2004-13:10:07.38 |           | 143.62482 |
| 11/17/2004-13:10:07.54 |           | 157.30337 |
| 11/17/2004-13:10:07.70 |           | 172.44748 |
| 11/17/2004-13:10:07.86 |           | 185.14900 |
| 11/17/2004-13:10:08.02 |           | 198.82755 |
| 11/17/2004-13:10:08.18 |           | 211.04055 |

**Figure 5 - Example MDR Transform Tool Output**

This tool allows an analyst or engineer to easily conduct time series analysis of several MDR parameters simultaneously. It also aids us in conducting profiling and basic descriptive analysis of the underlying data. Figure 6 show an example chart produced by Excel with data from our tool. This type of analytical product was previously not available before this transformation.





**Figure 6 - Example MDR Analysis Using Transformed Data**

The second data analysis task we performed on the MDR data was to profile the frequency at which MDR parameters are actually recorded in the field. We examined 23 individual MDR usage periods from field units, and examined which parameters were tracked, and how often. We then conducted a Pareto analysis to ascertain which parameters were the main contributors to the MDR data file.

The results of this analysis are shown in Appendix D. This analysis leads us to the following conclusions:

- The average number of MDR recorded values per usage period (summation of all parameters) is 81347.13 individual parameter recordings.

- The most frequently recorded MDR parameter produces an average of 2546.9 individual data recordings per usage period.
- The least frequently recorded MDR parameter is recorded at an average of 0 times per usage period. A total of 90 parameters share this distinction.
- Roughly 10% of the available parameters cause 80% of the logged values.

### MDR Issues

At this point, we identify two main issues with the MDR source data. First, the data is not truly continuous. Because data is only recorded when parameters exceed individual trigger points, some type of interpolation is required to fill in the “gaps.” This is easily noted in the extract from our MDR translation tool shown in Figure 4. If no parameter value was logged for a particular DTG, we log a null value. However, this is not quite accurate; the parameter did have some value at that time (it just wasn’t recorded). In order to make the data truly continuous, some value must be entered for the null values. Possible entries might be the last known value, average or mode of last and next value, or individual linear/non-linear functions based on known parameter characteristics.

The second issue we identify with MDR data stems from the sheer volume of information recorded. We suggest that in future implementations of the CBM Data Warehouse, some efforts are made to scope the amount of MDR parameters that are actually loaded into the warehouse. This scoping decision could be based on the needs of analysts and engineers. For example, perhaps no one is interested in the Co-Pilot Gunner’s Master Arm Switch Position, so this MDR parameter is never loaded.

### 2.3.2.2 Analysis of Vibration Monitoring and Enhancement (VMEP) Data

#### VMEP Overview

The Vibration Monitoring and Enhancement Program is a digital source collector that records vibration information for components on the AH64A, AH64D, UH60A, and CH47 aircraft. In the CBM Proof of Principle, we will only be using AH64D VMEP data. The VMEP system

consists of a set of 21 sensors mounted on the aircraft, and a centralized processing unit (CPU) that collects and processes information from each sensor. VMEP is a dual purpose system that (1) provides information used to gauge the health of components (from a vibration perspective) and (2) is used to perform "rotor smoothing" for the main and tail rotor systems of the aircraft. A detailed explanation of the entire VMEP system is available at [9].

The VMEP system generates a series of recordings for each VMEP usage period. A VMEP usage period corresponds to a single "mission" or use of the VMEP system. A VMEP usage period is created each time the VMEP system is powered on and the aircraft main rotor RPM exceeds 90% available rotor speed.

#### VMEP Parameters

The VMEP system periodically logs Condition Indicators (CIs) for several components of interest on the aircraft. These CIs serve as surrogates for the level of vibration exuded by each component. These CIs are listed and described in Figure 7.

#### VMEP Data Management

The VMEP CPU samples each VMEP sensor at a frequency of roughly 20 Hertz. The CPU then uses on board software to produce the CIs listed above at a rate of 0.5 Hz. A technician periodically connects to the VMEP CPU with a laptop (VMEP Ground Station) and downloads the CI values. Maintenance personnel and analyst can then use the VMEP Ground Station to view the CIs, including CI historical trends. This information can be used to manually trigger certain maintenance actions such as increased component inspections or component removals.

In order to convert the VMEP data into a text form readable by third-party software (and loading into the CBM Data Warehouse), one must first use the VMEP Ground Station to export the VMEP data to a binary file. This binary file is then translated to readable text using a translation tool provided by the VMEP manufacturer, Intelligent Automation Corporation (IAC).

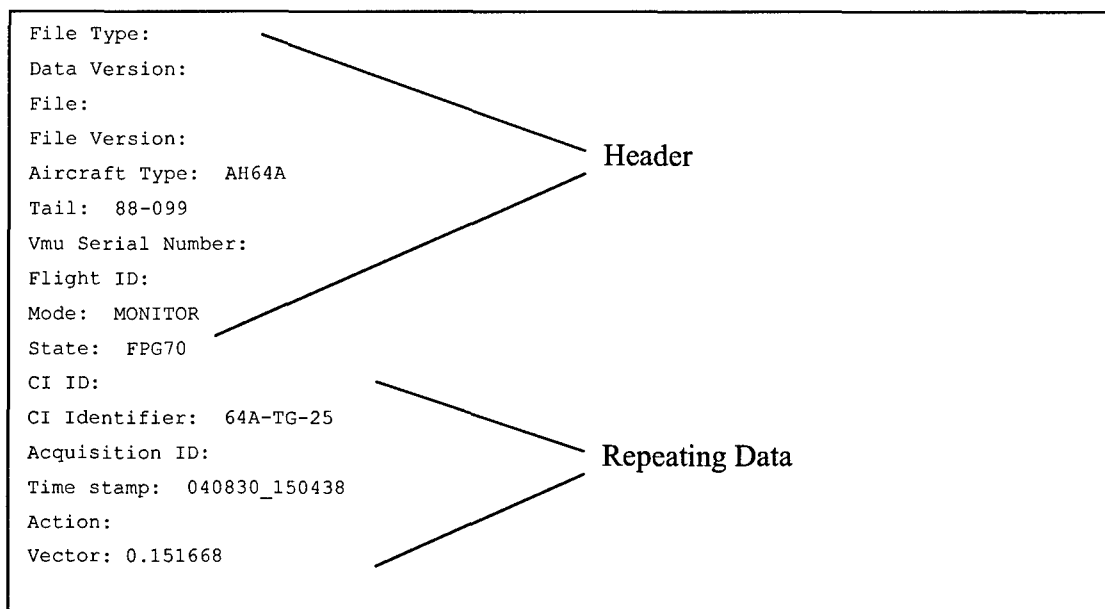
| CL ID            | DESCRIPTION   | MIN VALUE | MAX VALUE | UNITS |
|------------------|---|-----------|-----------|-------|
| 64D-AP-13        | AH64D APU drive shaft 1R frequency in monitor mode  | 0         | 10000     | IPS   |
| 64D-AP-14        | AH64D APU drive shaft 2R frequency in monitor mode  | 0         | 10000     | IPS   |
| 64D-AP-15        | AH64D APU gas generator 1R vibration in monitor mode  | 0         | 10000     | IPS   |
| 64D-AP-17        | AH64D APU high frequency vibration  | 0         | 10000     | IPS   |
| 64D-AP-19        | AH64D APU clutch bearing fault vib from AM demodulation of high frequency vib energy measured by APU sensor | 0         | 10000     | IPS   |
| 64D-G-25         | AH64D intermediate gear box input shaft 1R as measured by IGB sensor in monitor mode                        | 0         | 10000     | IPS   |
| 64D-G-26         | AH64D intermediate gear box modulation ratio as measured by IGB sensor in monitor mode                      | 0         | 10000     | IPS   |
| 64D-MR-MA-LAT-01 | AH64D main rotor 1R vib as measured by Lat sensor in monitor mode   | 0         | 10000     | IPS   |
| 64D-MR-MA-LAT-02 | AH64D main rotor 1R phase as measured by Lat sensor in monitor mode   | 0         | 10000     | IPS   |
| 64D-MR-MA-LAT-03 | AH64D main rotor 4R vib as measured by Lat sensor in monitor mode   | 0         | 10000     | IPS   |
| 64D-MR-MA-VRT-01 | AH64D main rotor 1R vib as measured by Vert sensor in monitor mode  | 0         | 10000     | IPS   |
| 64D-MR-MA-VRT-02 | AH64D main rotor 1R phase as measured by Vert sensor in monitor mode  | 0         | 10000     | IPS   |
| 64D-MR-MA-VRT-03 | AH64D main rotor 4R vib as measured by Vert sensor in monitor mode  | 0         | 10000     | IPS   |
| 64D-TG-25        | AH64D tail rotor 1R as measured by IGB sensor in monitor mode   | 0         | 10000     | IPS   |
| 64D-TG-26        | AH64D tail rotor modulation ratio as measured by IGB sensor in monitor mode                                 | 0         | 10000     | IPS   |
| 64D-TR-10        | AH64 tail rotor gear box output shaft 1R as measured by IGB sensor in monitor mode                          | 0         | 10000     | IPS   |
| 64D-TR-12        | AH64 tail rotor gear box output shaft 1R as measured by Tail Lat sensor in monitor mode                     | 0         | 10000     | IPS   |
| 64D-TR-20        | AH64 tail rotor 1R vib as measured by Tail sensor in monitor mode   | 0         | 10000     | IPS   |
| 64D-TR-21        | AH64D tail rotor 2R vib as measured by Tail sensor in monitor mode  | 0         | 10000     | IPS   |
| 64D-TR-22        | AH64 tail rotor 1R phase as measured by Tail sensor in monitor mode   | 0         | 10000     | IPS   |

Figure 7 - VMPE Parameter List

The program name for this translation tool is exporttotext.exe. This tool produces a series of flat text files. These files fit into three general categories – system test files, rotor smoothing files, and CI measurement files. The files of interest to the CBM Prototype Data Warehouse are the CI measurement files (labeled All\_CI.txt).

### VMEP Schema

Each All\_CI.txt file consists of a flat text file broken down into 10 lines of header information and 6 lines of recurring CI data. An extract of a sample All\_CI.txt file is shown in Figure 8. The header information lists information about the particular aircraft and VMEP system settings. The recurring CI data portion logs each CI's value every 120 seconds of the VMEP usage period.



**Figure 8 - Example VMEP All\_CI.txt file**

### VMEP Data Analysis

VMEP data recordings follow a regular established pattern as described above. Each VMEP usage period generates a uniform number of recordings for each of the 20 available CIs. Profiling of 30 VMEP usage period reveals that each VMEP usage period produces an average of 120 recordings per CI.

### VMEP Issues

Like the MDR Data, the VMEP CIs are not truly continuous. Each CI is a snap-shot in time, and extrapolation is required to ascertain what is occurring between each CI recording.

#### 2.3.2.3 Analysis of Enhanced Electronic Log Book (ELAS) Data

### ELAS Overview

The Enhanced Electronic Logbook Automation System (ELAS) is a maintenance management system deployed within Army Aviation units. This system is the primary source of information for all low-level maintenance tasks and faults occurring at the unit level. DA Pam 738-751 specifies manual records that must be maintained on each Army aircraft [11]. ELAS automates many of the records electronically, including information about maintenance tasks, general aircraft usage, aircraft configuration, parts ordering, fault information, fuel information, and crew manning. In the CBM Data Warehouse Prototype, we are primarily interested in using ELAS to obtain what maintenance actions are performed on the aircraft as well as failure and fault information for components.

### ELAS Data Management

ELAS is fielded as a stand alone graphical user interface built on a Microsoft Access (MS Access) backend database. Each aircraft has its own database, and Army units combine each aircraft database into a single database for the unit. This database is easily exported or copied, and readable by MS Access or a variety of ODBC-enabled database technologies.

### ELAS Schema

Appendix E lists the schema information for ELAS. Tables of particular interest to the CBM Prototype Data Warehouse include: FAULT, COMPONENT, AIRCRAFT, FLIGHT, and ACTION.

### ELAS Data Analysis

Figure 9 shows our analysis and profiling information taken from three months worth of ELAS data involving 24 AH64D helicopters.

| <b>ELAS Table</b> | <b>Total Entries</b> |
|-------------------|----------------------|
| FAULT             | 24033                |
| COMPONENT         | 6937                 |
| AIRCRAFT          | 24                   |
| FLIGHT            | 1841                 |
| ACTION            | 23378                |

**Figure 9 - ELAS Data Profiling**

This table shows that, from a data volume point of view, the ELAS data set is very manageable.

### ELAS Data Issues

The main issues with ELAS fall into two general categories – standardized coding errors and human text errors. Figure 10 introduces these errors. The standardized coding errors are caused when a maintainer fails to enter the correct DA PAM 738-751 prescribed codes for one of the following– Work Unit Code (WUC), Date/Time, Aircraft Hours, When Discovered Code, How Recognized Code, Malfunction Code, and Maintenance Action Code. ELAS does not necessarily enforce logical entries for these codes, and the maintainer is free to enter whatever values they wish. Therefore it is completely possible that, due to a training deficiency or (more likely) operational necessity, the maintainer will enter an incorrect code. Much of this problem is due to the clumsiness of DA PAM 738-751. Additionally, ELAS could benefit from an intelligent graphical user interface that guides the user to make correct and logical entries based on the context of the maintenance action or fault. For example, if a generator fails on an aircraft,

then ELAS might limit the 11 possible How Recognized Codes to only those that make sense for a generator.

DTG and aircraft times must be checked/synched

Work Unit Code (WUC) must reflect correct component. In this example 00 is the WUC for the AH64. Should equal the WUC for driveshaft/drivetrain.

"ENG to XMSN D/S" must be translated into the actual Par#/NSN for #3 AH-64 Drive Shaft

Failure "CORRODED" must be classified as an appropriate failure code

Action Code must match action. Here S stands for "Install". Should read as "X", the code for replaced.

Coresponding sub maintenance action (Drive shaft bolt replacement) must be linked as parent child actions

Component replacement must be captured as separate entity. Must capture serial # of replaced parts (if applicable). Corresponding supply action must be captured as separate entity

Figure 10 - Example ELAS Data Errors

The human text errors are more problematic. Most of the critical information about a maintenance action or fault is contained in the Fault/Remarks portion of the ELAS generated form shown in Figure 10. This is where the maintainer records the nature and description of the actual maintenance task or fault. Likewise, other important information, such as part number & serial number are also recorded here. This information is free text, and extremely difficult to extract. For example, for a failed drive shaft the maintainer might enter any of the following - "Failed Drive Shaft", "Failed D/S" or "Number 3 Drive Shaft Failed on Run Up." Translating this to a standard database entry is extremely difficult. Likewise, if the maintainer fails to enter the part number, stock number, or serial number, we have no way of tracking the particular component involved.



#### 2.3.2.4 Analysis of UniRAM Data

##### UniRAM Overview

The UniRAM data set is analogous to the ELAS dataset. Developed for use by the Aviation Technical Test Center (ATTC), UniRAM is a more logical and stringent approach to managing DA PAM 738-751 data. More importantly, the Army maintains an experienced cadre of professional technicians at Fort Rucker, Alabama that are well versed at translating ELAS data into UniRAM data. Because of this fact, we will opt to use a UniRAM version of ELAS data for the maintenance task and fault information for the CBM Prototype Data Warehouse.

##### UniRAM Data Management

The UniRAM Data Management process begins with an ELAS data set. The ELAS dataset is scrubbed by technicians at Fort Rucker who perform one or more of the following tasks:

*Match, lookup, and record ELAS component information* - This process consists of matching components listed in electronic 2408-13-1 narratives with components listed in actual Army maintenance manuals and supply data sources. This includes matching NSN, NIIN, part number, work unit codes (WUC), position codes, serial number, and TSI/TSN. This process will require a human or intelligent system to derive this information from narrative entries.

*Match, lookup, and record ELAS maintenance actions* - This process involves matching the maintenance action listed on the 2408-13-1 (codes and narratives) to standardized maintenance actions specified in Army maintenance doctrine. This includes maintenance function, maintenance interval, maintenance level, tools, man hours required, etc.

*Match, lookup, and record ELAS failure information* - This process involves matching the failure event information on the 2408-13-1 (codes and narratives) to recognized failure modes in the Army maintenance doctrine. This includes failure codes, malfunction effect, how recognized, when discovered, when occurred, and failure measurements (e.g. "axial bearing play is 0.334").

*Normalize ELAS timings and sequencing* - This process involves matching and correcting DTG and aircraft hour entries on the 2408-13-1 electronic entry. For example, if the unit records local time, convert it to GMT. Or, ensure the aircraft hours match time at failure.

*Check all 2408 ELAS codes* - This process involves checking all 2408 codes for logical consistency. For example, the “how discovered” code for a cracked rotor blade should say “post flight” not “during flight.”

*Match, lookup, and record ELAS supply actions* - This process involves matching and tagging 2408-13-1 entries that involve supply actions. For example –Was the component replaced? What component (by serial number) replaced the failed component? When did the replacement occur?

It is important to note that only a subset of the above tasks are performed for the CBM Prototype Data Warehouse. However, we believe that all tasks will need to be performed in future generations of the CBM Data Warehouse unless errors are corrected at the source.

The results of the UniRAM Data Management set is a populated Oracle-based UniRAM data set containing all relevant maintenance actions and faults.

#### UniRAM Schema

UniRAM schema information is located at Appendix F. A complete set of documentation is available at [12].

#### UniRAM Data Analysis

Our profiling and analysis of the UniRAM data set is identical to that of ELAS.

#### UniRAM Data Issues

The main issue with the UniRAM dataset stems from the manpower required to perform the ELAS translation and cleansing. We estimate that the average data technician can translate

roughly two ELAS entries per hour. This represents a significant financial investment for the Army to cleanse and normalize maintenance and fault information.

#### 2.3.2.5 Analysis of Other Relevant Data Sources

There are several other data sources required to meet stake holder needs in the CBM Data Warehouse Prototype. Most of these represent on-change data sources in the sense that they are only populated once (per major schema change), and are not regularly updated data sets like MDR, VMEP, or ELAS. Each of these is briefly discussed below.

Unit Information – We need a source of data for the units providing information to the CBM Data Warehouse. For purposes of the CBM Prototype, we will use the unit information contained in the ELAS data set.

General Catalog of Components – In order to facilitate maintenance tracking and planning, we need a list of all possible components that might exist for a certain aircraft. This information, often referred to as a legitimate code file (LCF), must include component nomenclature, logistics numbering (National Stock Number and manufacturer's part number), position codes, assembly information, and other relevant information. Currently, we identify three main sources for this information. First, the ELAS and UniRAM LCFs contain part tables for common components maintained on the AH64D. However, these databases only include components maintained in the past, and might not include all possible components. Second, Boeing maintains a LCF containing over 80,000 components for the AH64D. Third, the IMMC maintains a LCF of expensive and flight safety critical components for all Army aircraft. It is important to note that each of these data sources is slightly different, and they are not all in agreement. Therefore, for purposes of the CBM Prototype Data Warehouse, we will use a combination of the three. This data source will be manually populated by merging the relevant general component tables in ELAS, UniRAM, Boeing Component List, and IMMC DA Form 2410 Database.

General Catalog of Maintenance Tasks – Another data source required to perform maintenance planning is a catalog of common maintenance tasks required for all components on an aircraft. This data source would list standard repairs, tasks, and inspections. This information is vital if we are going to forecast future maintenance tasks and repair parts based on prognostic predictions. Currently, we know of only one data source for this information. The AH64D Integrated Electronic Technical Manual (IETM) is an automated tool that reflects Army technical manuals prescribing common maintenance tasks. However, the IETM source database is a proprietary product, and extracting the general catalog of maintenance tasks was not possible at the time of this writing. For purposes of the CBM Prototype Data Warehouse, we will manually enter sample information from the IETM or hard copy technical manuals.

· General Catalog of Failures - In order to manage and forecast component failures, the CBM Prototype Data Warehouse requires a catalog of detailed failures for each aircraft. This information could be obtained by mining the ELAS or UniRAM databases, but again, we are limited to those failures that have occurred in the past. This information is also available in the IETM, but as mentioned above, the raw data is proprietary. For purposes of this design, we will use ELAS and UniRAM fault information.

General Failures to General Maintenance Task Mappings – In order to plan which maintenance tasks are required to address certain observed or predicted failures, we need a mapping of general maintenance tasks to general failures. This data resides electronically in the IETM, but is unavailable. Therefore, we will manually populate this data with sample information from the IETM or hard copy technical manuals.

Tools & Publications – Automated maintenance planning and maintenance analysis will require a list of supporting tools and publications for certain component maintenance tasks and repairs. This information also resides electronically in the IETM, and will be manually populated for this design.

Manufacturer Information – Several stakeholders expressed interest in being able to view manufacturer information during CBM component analysis. Several existing LOGSA data sources can provide this information.

#### 2.3.2.6 Required Future Data Sources

As we alluded to in the beginning of Section 3.2.1.1, all relevant data sources were not directly available for incorporation into the CBM Prototype Data Warehouse. However, these sources must be added in order to support comprehensive CBM analysis across the Army Aviation fleet. Each of these is briefly described below.

IMMC 2410 Data. The Army IMMC maintains a comprehensive database of all DA Form 2410 tracked items. This database, known as the Maintenance Consolidated Database System (MCDS), contains installation, removal, overhaul, and repair information for high-dollar and flight critical components. This data must be integrated with the other data sources listed above in order to provide detailed part tracking and failure information to our stakeholders.

CH47 and UH60 Health Usage Monitoring System (HUMS) Data. The CBM Prototype Data Warehouse needs an MDR/VMEP equivalent data source for the UH60 and CH47 aircraft. This information is vital to support state, usage, and vibration analysis of components on these aircraft. Currently, the UH60 community does have a Goodrich developed HUMS, and this data is collected into a separate database maintained by the UH60 Program Manager. This information could be readily integrated once made available. The CH47 community is still developing its own HUMS program.

CH47 and UH60 Maintenance Management System. The CBM Prototype Data Warehouse also needs an ELAS-like source of maintenance tasks and fault information for the CH47 and UH60 aircraft. The CH47 maintains a Cargo Platform Maintenance Environment (CPME) which was made available toward the end of our design. The UH60 also maintains a similar system which could be easily integrated once made available.

Integrated Electronic Technical Manual. The CBM Prototype Data Warehouse needs an electronic source of data for the data sources described in Section 2.3.2.5. The Integrated Electronic Technical Manuals for each airframe could provide much of this information if raw source data schemas from these manuals were made available.

#### 2.3.2.7 Source Data Issues of Concern

Before concluding data analysis, we will first comment on two major issues that cut across much of the aforementioned analysis of data sources. These issues fall into two categories - unique component identification and component configuration identification.

Unique Component Identification Issues. In order to facilitate accurate and meaningful analysis of components failures (a key tenant to CBM) analysts and engineers must be able to isolate individual components across the fleet. Because of the way components are tracked in the Army supply system, this is often a very difficult task. A short primer on parts tracking illuminates this point. Currently each component in the Army parts system is slotted against a National Stock Number (NSN). However, for each NSN, there can be literally dozens of varied components that satisfy this NSN. These components are identified by a government or commercial part identification code known as a part number. Typically part numbers correspond to a certain series of the component, perhaps based on manufacturing group or configuration. More than one part number may be associated with an NSN, however all parts associated will be the same in fit, form and function. Note, part numbers are not unique, and it's possible to have the same part number for two completely different parts satisfying completely different NSNs.

For some part numbers, individual parts are tracked by serial number. However, many parts of interest to engineers and analysts are not tracked by serial number, or are assigned locally managed serial numbers (setting up the possibility of two fleet-wide components sharing a local serial number). Until all parts of interests are able to be uniquely identified, CBM implementation will be limited. This is not a novel problem, and is currently being address by the DoD Unique Identifier (UID) Program [13]. Future generations of the CBM Data Warehouse will greatly benefit from this initiative.

Component Configuration Issues. The second major data source issue deals with how component configuration is described by the Army Aviation Management System. Currently, configuration information establishing where components might be installed on Army Aircraft is specified by a Work Unit Code (WUC). The work unit code is a hierarchical encoding specifying at what level of assembly a component is installed. This code represents the lowest owning sub-assembly and higher assemblies that encapsulate a given component. For example a WUC of 04A is an AH64D Engine Assembly, 04A01 is the engine's cold section module, and 04A01B is the cold section's power take-off assembly. For each WUC, there are many different NSN/part number combinations that might fulfill the WUC. Moreover, an NSN/ part number combination might be capable of fulfilling multiple WUCs, and might appear on more than one helicopter. For example, a particular bearing might be a subassembly for both main engines on the AH64 as well as UH60 aircraft. Additionally, some WUCs are entirely conceptual, and have no satisfying part number.

Of major concern is the fact that WUCs are not recognized outside of the Army Aviation Maintenance Community. Therefore, there is no recognized standard for cross referencing WUCs to NSNs/part numbers. Several agencies, such as IMMC, AED, UH60 Program Office, and ATTC have devised effective cross-references using technical manuals and procurement records. However, these references are not in agreement and are not recognized Army-wide. Therefore, within some of our source data systems, WUCs are not in agreement.

We recommend that the Army adopt, publish, and enforce an easy to use and accepted standard for representing where components might be installed on Army systems. This reference must accommodate existing references, and must hierarchically specify every component on the system from the end-item to the lowest washer or rivet.

### 2.3.3 Source Data Misconceptions

During our study of the aforementioned data sources, we encountered several common misconceptions. These misconceptions have fueled reluctance to fully embrace the design and implementation of a CBM Data Warehouse. The first misconception encountered was that many of the source data systems, particularly the UH60 and CH47 Platform Maintenance

Environments (PMEs), already provide the functionality required by the CBM Data Warehouse. The second misconception is that only one copy of the data should exist, and allowing data to be copied to another data store creates confusion and contradictory information.

The first misconception is addressed by examining the difference between Online Transactional Processes (OLTP) and Online Analytical Processes (OLAP) [15]. Figure 11 summarizes these differences. OLTP processes, such as the PMEs, are systems that provide fast mission-critical data primarily used for management and decision making purposes. This information is typically of a low-grained and aggregate nature. These processes are built on relatively simple queries that touch a small amount of data (one or two tables at a time). These queries must be executed within seconds. OLTP processes also have many updates, and typically store months of data. Dimensional data modeling is sufficient for these processes, as complex database relationships are not required.

| On-Line Analytical Processing<br>(OLAP) Analytical Data Warehouse   | On-Line Transactional Processing<br>(OLTP) Fleet Management System  |
|---|---|
| <ul style="list-style-type: none"> <li>- Analytical data</li> <li>- High level of granularity</li> <li>- Many slow transactions (minutes)</li> <li>- Complex queries</li> <li>- Queries touch large amounts of data</li> <li>- Store <b>years</b> worth of data</li> <li>- Relational based data model</li> <li>- Read only</li> <li>- Fed by OLTP data</li> </ul> <p><u>Example:</u><br/>What where the preceding temperature, oil pressure, and vibration levels of all nose gearboxes replaced during winter months on all helicopters in Afghanistan?</p> | <ul style="list-style-type: none"> <li>- Mission critical data</li> <li>- Low level of granularity</li> <li>- Many fast transactions (seconds)</li> <li>- Simple queries</li> <li>- Queries touch small amount of data</li> <li>- Store <b>months</b> worth of data</li> <li>- Dimensional based data model</li> <li>- Many, frequent updates</li> <li>- Provide base information and updates to OLAP</li> </ul> <p><u>Example:</u><br/>What helicopters in Afghanistan have nose gearboxes from vendor X with more than 500 hours of operating time?</p> |

Figure 11 - Differences between OLAP and OLTP Systems

OLAP processes, represented by the CBM Data Warehouse, are systems that provide slow access and extremely high-grained data used for analytical purposes. These processes touch large amounts of data (dozens of tables) at the same time and are built on complex queries. Such queries can take minutes to execute. OLAP processes are largely read-only, and can involve



years worth of data. These systems are largely based on relational data models in order to support the complex nature of analytical queries.

Before moving on to the second misconception, it is important to note that OLTP and OLAP systems are not compatible, and must exist as independent information systems. The reasons for this are found in their different modeling requirements, their different data source requirements, and their different performance requirements. OLTP systems require de-normalized, streamlined data models while OLAP systems required highly-normalized ones. OLTP systems target a relatively few number of specific business processes, and as a result, their designs reflect the peculiarities of these processes. OLAP systems integrate data from many different and unrelated processes, and their designs focus on the processes commonalities. Finally, OLTP systems require near instant transaction times while OLAP systems can wait minutes. From a design standpoint, these systems should not have to fight for the same computer resources.

The second misconception, the one stating that only one copy of data should exist, represents a decision making issue, not a data management issue. The desire to restrict data to a lone source stems from decision makers and managers wanting to retain control of decisions that are made with the data. This is a very valid concern given the very wide group of stakeholders who will use the CBM Data Warehouse. However, in our opinion, this concern should be addressed by controlled decision making policy not controlled data management policy. Limiting access to data severely limits the positive benefits reaped by a full and honest review of information contained in that data. In the arena of intellectual and analytical ideas, open and honest disagreement about different conclusions drawn from the same data is very positive. If two engineers, working for two independent agencies arrive at different conclusions, then the resultant discussion and analysis helps forge improvements for the entire community. This idea is analogous to the open-source software movement, where open and unrestricted access to source code by independent users has produced products that far surpass the capabilities and performance of their commercial counterparts [16].

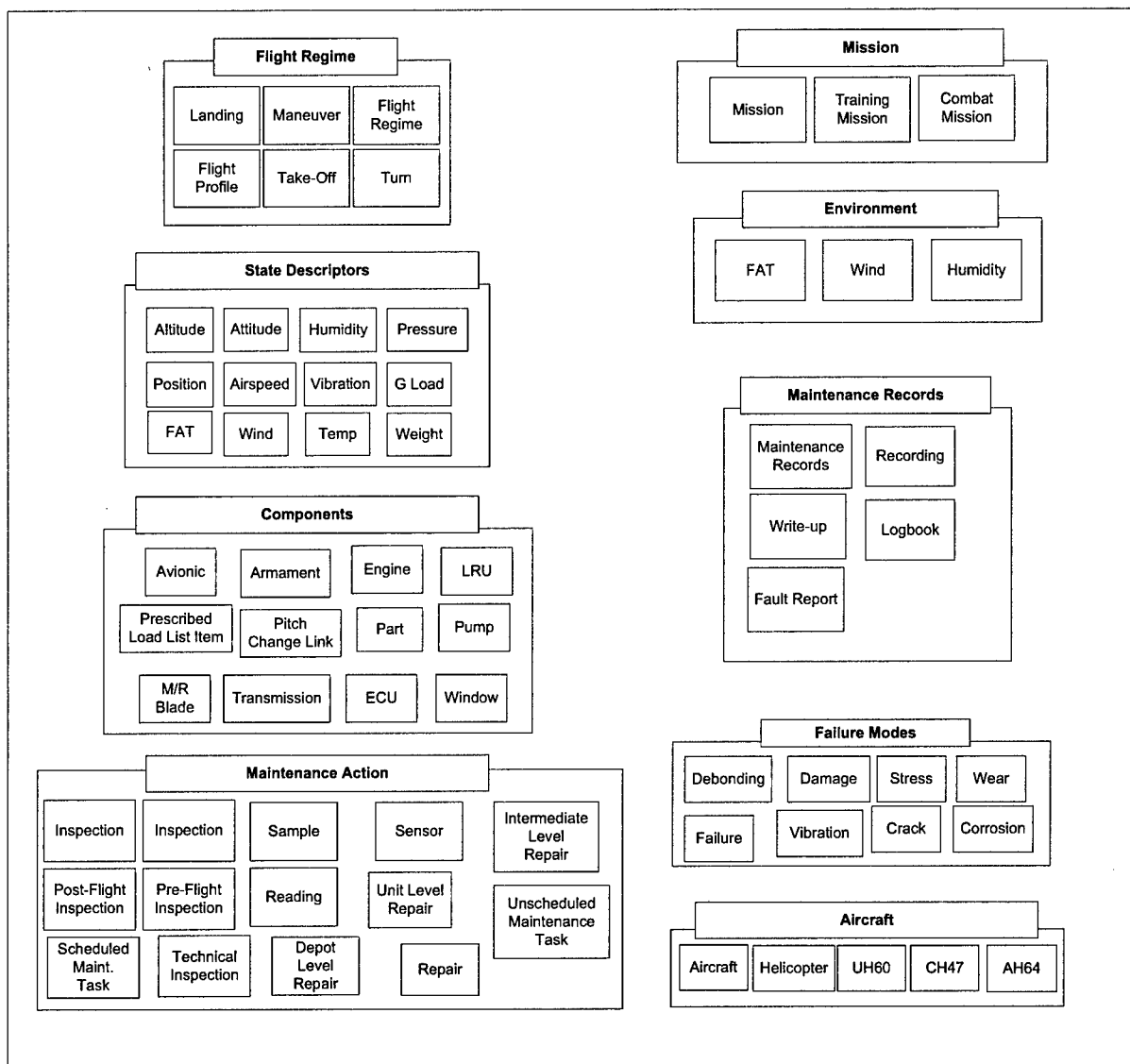
#### 2.3.4 Common System Components

After an analysis of pertinent source data, we are ready to decompose and extract the common data objects from all data sources. These objects will form the principal components of

the CBM Data Warehouse. While decomposing these individual data sources, we avoided decomposing the system according to existing entities, attributes, and relationships. Doing so would have resulted in creation of a data model that is simply a conglomeration of disparate data schemas forced into a single schema. Such an approach would not necessarily alleviate the inconsistent data definitions, data relationships, and data transformation rules. In short we needed an approach that focused on the “what” not the “how.”

In conducting our system decomposition, we also examined the common thread running through each data source – the Total Army Maintenance Management System Aviation (TAMMS-A). The TAMMS-A represents the actual maintenance system as it exists in practice, and incorporates all possible aspects of Army Aviation Maintenance [11]. Indeed, each current maintenance data source serves as a lens through which researchers and managers examine specific aspects of the entire TAMMS-A system. There are many shortcomings with TAMMS-A, a discussion of which goes beyond the scope of our research. Because of this we opted not to base our model on TAMMS-A. However, any design we devise must be capable of encapsulating the objects and concepts outlined in TAMMS-A.

We use an Affinity Diagramming process to help understand the important elements of our system. During this process we analyze the source data source schemas, the stakeholder interviews, and TAMMS-A to extract all relevant objects, processes, and concepts. This process follows the object-oriented systems development approach outlined in [14]. The process first uses a brainstorming technique to collect all relevant objects and concepts. We then group like-sounding objects into groups, and eliminated duplicate entries. Finally, we attempt to attach meaningful titles to each group. The results of this process, shown in Figure 12, provide an initial loose grouping of system components for information contained in the CBM Prototype system.



**Figure 12 - Affinity Diagram of CBM Data Warehouse Components**

## 2.4 Functional Analysis

Our next step in the needs analysis is to conduct a functional analysis of the CBM Prototype Data Warehouse. This functional analysis will include a functional decomposition that lists the major data warehouse functions, a functional hierarchy that orders these functions into parent-child relationships, and a functional flow analysis that details how these functions interact.

### 2.4.1 Functional Decomposition.

The major top level functions required by the data warehouse are:

Download Data (Function 1.0)

Store Data (Function 2.0)

Transport Data (Function 3.0)

Translate Data (Function 4.0)

Process Data (Function 5.0)

Load Data into CBM Data Warehouse (Function 6.0)

Optimize Data for Presentation (Function 7.0)

The following paragraphs define each of these top level functions, and further specify important sub functions.

#### Function 1.0 - Download Data

This function consists of all actions required to capture the information from onboard aircraft collection equipment, or aircraft paired equipment (enhanced log books). The function is decomposed by data type below.

#### Function 1.1 - Download VMEP Data from Aircraft

This function consists of downloading the VMEP data from each individual aircraft into a VMEP ground station. This is accomplished by linking a VMEP ground station computer to the aircraft and then downloading pertinent files. This process takes approximately 20 minutes per aircraft. The data is stored in a Microsoft Access database (mdb) on the VMEP ground station. One can view the data using the VMEP ground station application, export the data as comma delimited text, or use any software package capable of reading 'mdb' data.

#### Function 1.2 - Download MDR Data from Aircraft

This function consists of downloading the MDR data from each individual aircraft into a computer. This is accomplished with a MDR-specific software application (LIMSSGAS)

running on a laptop computer. This process takes approximately 30 minutes per aircraft. This data is viewable only with computers equipped with the MDR-specific proprietary software.

#### Function 1.3 - Download ELAS Data from Logbook

This function consists of downloading data from each individual aircraft electronic logbook (each aircraft's laptop) into a central ELAS computer file (Battalion Production Control Computer). This process is near instantaneous and accomplished as part of normal ELAS standing operating procedures. The electronic logbooks – laptops paired with each aircraft - are continually updated after each flight. The central ELAS computer file is a single ELAS database that stores all faults for a fleet of aircraft. This file is in Microsoft Access format (mdb) and readable by the ELAS software application or any software package capable of reading 'mdb' data.

#### Function 2.0 - Store Data

Store Data consists of storing the data as it is transferred from one location to the next.

#### Function 2.1 - Store Raw VMEP Data

Store Raw VMEP Data consists of storing VMEP Data in its native form (from a VMEP ground station) onto a local storage device (backup hard drive) or a removable storage media (CD). This process, akin to a data backup, is normally accomplished once per week, and takes approximately 12 minutes.

#### Function 2.2 - Store Raw MDR Data

Store Raw MDR Data consists of storing the MDR data collected with the MDR-specific computer into a local storage device (backup hard drive) or removable storage device (CD). This process, akin to a data backup, is normally accomplished once per week, and takes approximately 12 minutes. This massive data set (100MB+ per flight), is in binary format, and unusable for analysis until translated.

### Function 2.3 - Store Raw ELAS Data

Store Raw ELAS Data consists of storing a copy of the unit ELAS database (a single 'mdb' file) on a local storage device (backup hard drive) or removable storage device (CD). This process, akin to a data backup, is normally accomplished once per week, and takes approximately 12 minutes.

### Function 2.5 - Store Processed MDR Data

Store Processed MDR consists of storing the "clean" or usable MDR data after it has been processed by the data process function (see Function 4.2)

### Function 2.6 - Store Processed ELAS Data

Store Processed ELAS consists of storing the clean ELAS data after it has been processed by the data process function (see Function 4.3)

### Function 2.7 - Store Processed VMEP Data

Store Processed VMEP consists of storing the clean VMEP data after it has been processed by the data process function (see Function 4.1)

### Function 3.0 - Translate Data

The Translated Data function consists of all functions required to translate maintenance data from one form (syntax/schema) to another.

### Function 3.1 - Translate Raw MDR Data

The Translate Raw MDR Data function consists of using the MAST program to translate raw MDR data (in binary form) to interpretable text data (ASCII CSV).

### Function 3.2 - Translate Raw VMEP Data

The Translate Raw VMEP Data function consists of using the exporttotext.exe program to translate raw VMEP data (in binary form) to interpretable text data (ASCII CSV).

#### Function 4.0 - Process Data

The Process Data function consists of preparing the various data sources for storage as standard data warehouse entities. This consists of the following general functions – error correction, time synchronization, information correlation, redundant information control, and implicit information extrapolation.

#### Function 4.1 - Process VMEP Data

The Process VMEP Data Function consists of preparing the VMEP data source for storage as standard data warehouse entities, and includes the following sub-functions.

##### Function 4.1.1 - Correct VMEP Errors

The Correct VMEP Errors Function consists of scanning the VMEP data set for obvious errors – failed sensors (flat-lines), dropped sample points, corrupted data, etc.

##### Function 4.1.2 - Standardize VMEP Timing

The Standardize VMEP Timing Function consists of synchronizing the VMEP GMT time with that of MDR. This is vital if vibration events (captured with VMEP) are to be correlated with usage events (captured mostly with MDR). The results of the exporttotext.exe program translate all times into the local machine time running the exporttotext.exe program.

#### Function 4.2 - Process MDR Data

The Process MDR Data Function consists of preparing the MDR data source for storage as standard data warehouse entities, and includes the following sub-functions.

##### Function 4.2.1 - Correct MDR Errors

The Correct MDR Errors Function consists of scanning the MDR data set for obvious errors – failed sensors (flat-line readings), data outside realistic ranges (super low temperatures, other improbable readings), corrupted data, etc.

#### Function 4.2.2 - Standardize MDR Timing

The Standardize MDR Timing Function consists of synchronizing the MDR GMT time with that of an outside/universal time, if required.

#### Function 4.3 - Process ELAS Data

The Process ELAS Data Functions consist of preparing the ELAS data source for storage as standard data warehouse entities.

##### Function 4.3.1 - Match, lookup, and record ELAS component information

This process consists of matching components listed in electronic DA Form 2408-13-1 narratives with components listed in actual Army maintenance manuals and supply data sources. This includes matching NSN, NIIN, part number, work unit codes (WUC), position codes, serial number, and TSI/TSN. This process will require a human or intelligent system to derive this information from narrative entries.

##### Function 4.3.2 - Match, lookup, and record ELAS maintenance actions

This process involves matching the maintenance action listed on the DA Form 2408-13-1 (codes and narratives) to maintenance actions specified in Army maintenance doctrine. This includes maintenance function, maintenance interval, maintenance level, tools, man hours required, etc.

##### Function 4.3.3 - Match, lookup, and record ELAS failure information

This process involves matching the failure event information on the DA Form 2408-13-1 (codes and narratives) to recognized failure modes in the Army maintenance doctrine. This includes failure codes, malfunction effect, how recognized, when discovered, when occurred, and failure measurements (e.g. "axial bearing play is 0.334").

##### Function 4.3.4 - Normalize ELAS timings and sequencing

This process involves matching and correcting DTG and aircraft hour entries on the DA Form 2408-13-1 electronic entry. For example, if the unit records local time, convert it to GMT. Or, ensure the aircraft hours match time at failure.



#### Function 4.3.5 - Check all 2408 ELAS codes

This process involves checking all DA From 2408 codes for logical consistency. For example, the “how discovered” code for a cracked rotor should say “post flight” not “during flight.”

#### Function 4.3.6 - Match, lookup, and record ELAS supply actions

This process involves matching and tagging DA From 2408-13-1 entries that involve supply actions. For example – Was the component replaced? What component (by serial number) replaced the failed component? When did the replacement occur?

#### Function 5.0 - Transport Data

The Transport Data function involves those functions required to move data from point A to point B. These Functions might be accomplished with mailed CDs or electronic transmission (SATCOM, FTP, SFTP, SIPRNET, etc).

#### Function 5.1 - Transport Raw VMEP Data from Aircraft to Unit HQ

This process includes all functions required to get the raw VMEP data from the aircraft to a centralized location in the unit. This is currently accomplished with cable-connected laptops (running VMEP ground station) or local wireless LANs inside the unit.

#### Function 5.2 - Transport Raw ELAS Data from Aircraft to Unit HQ

This process includes all functions required to get the raw ELAS data from the aircraft to a centralized location in the unit. This is currently a native function of each aircraft’s ELAS laptop (either cable connected or wireless).

#### Function 5.3 - Transport Raw MDR Data from Aircraft to Unit HQ

This process includes all functions required to get the raw MDR data from the aircraft to a centralized location in the unit. This is currently accomplished only with a cable-connected MDR-specific laptop.

#### Function 5.4 - Transport VMEP Raw Data from Unit to Data Processors

This process includes all functions required to get the raw VMEP data from the unit to the CBM Data Processors (those individuals tasked with processing and translating raw CBM data). This function will entail periodically transporting copies of the unit's central VMEP ground station data base via CD, ftp, or other means to data processors.

#### Function 5.5 - Transport MDR Raw Data from Unit to Data Processors

This process includes all functions required to get the raw MDR data from the unit to the CBM Data Processors. This will entail periodically transporting copies of the unit's MDR-specific laptop data set via CD, ftp, or other means to data processors.

#### Function 5.6- Transport ELAS Raw Data from Unit to Data Processors

This process includes all functions required to get the raw ELAS data from the unit to the CBM Data Processors. This will entail periodically transporting copies of the unit's central ELAS data base via CD, ftp, or other means to data processors.

#### Function 5.7 - Transport Processed VMEP Data from Data Processors to Data Warehouse

This process includes all functions required to get the processed VMEP data from Data Processors to the Data Warehouse.

#### Function 5.8 - Transport Processed MDR Data from Data Processors to Data Warehouse

This process includes all functions required to get the processed MDR data from Data Processors to the Data Warehouse.

#### Function 5.9 - Transport Processed ELAS Data from Data Processors to Data Warehouse

This process includes all functions required to get the processed ELAS data from Data Processors to the Data Warehouse.

#### Function 6.0 - Load Data into CBM Data Warehouse

This process includes all functionality required to load processed data into the CBM Data Warehouse

#### Function 6.1 - Translate VMEP Entities to DW Entities

This process includes all functionality required to store clean VMEP entities into the data warehouse entities. This is an automated process that will take place as the data is loaded.

#### Function 6.2 - Translate MDR Entities to DW Entities

This process includes all functionality required to store clean MDR entities into data warehouse entities. This is an electronic process that will take place as the data is loaded.

#### Function 6.3 - Translate ELAS Entities to Data Warehouse Entities

This process includes all functionality required to translate clean ELAS entities into data warehouse entities. This is an electronic process that will take place as the data is loaded.

#### Function 6.4 - Load Data Warehouse Entities

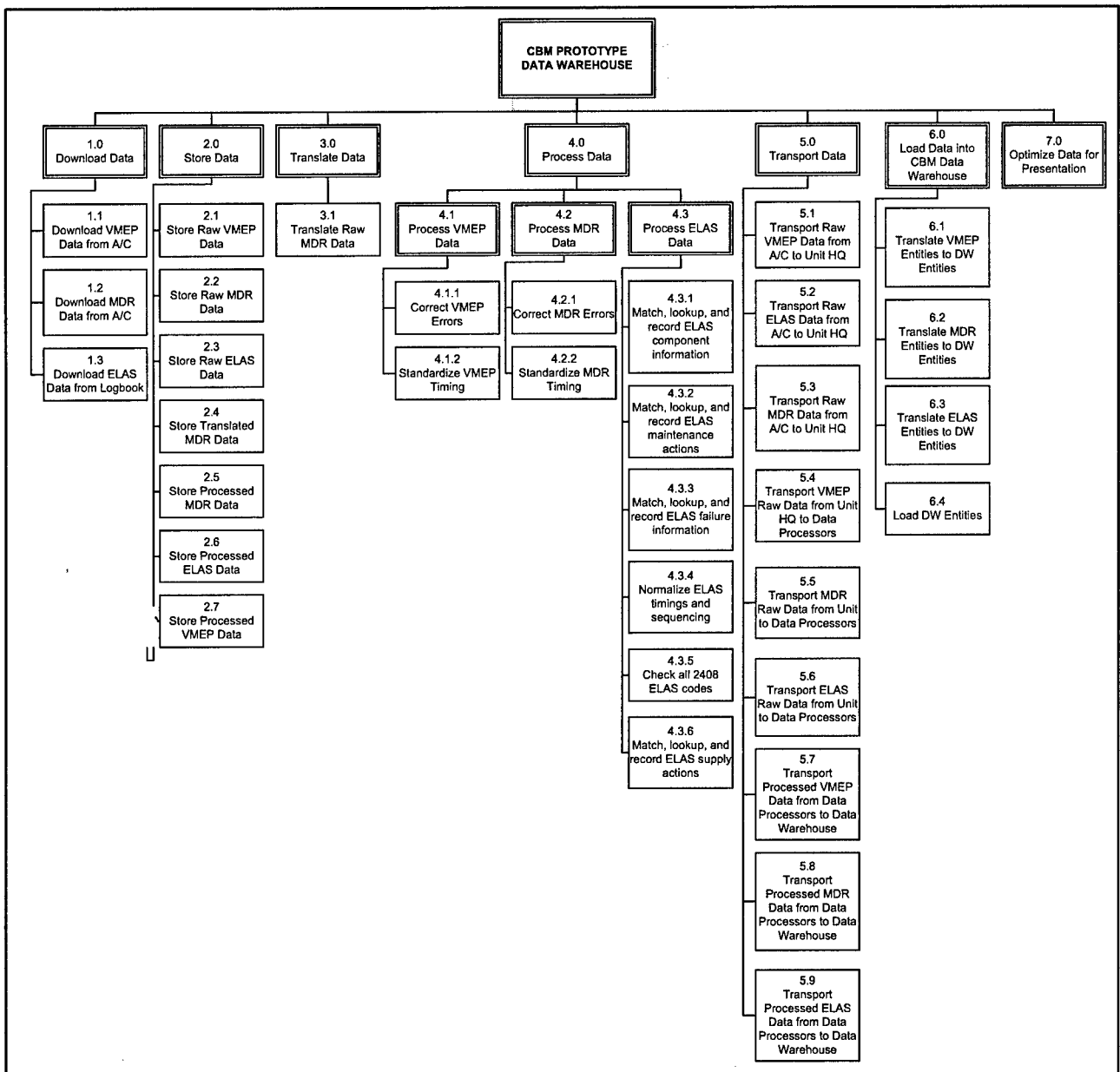
This process, a database function, takes translated Data Warehouse entities and stores them in appropriate tables in the data warehouse.

#### Function 7.0 - Optimize Data for Presentation

This process, a database function, involves organizing and optimizing the loaded data for use by the stakeholders.

#### 2.4.2 Functional Hierarchy

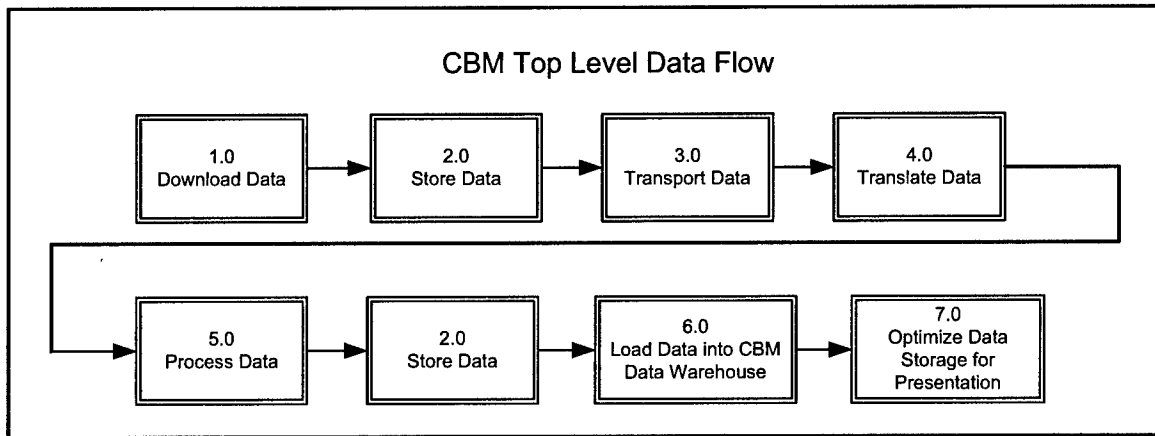
The next step involved with the Functional Analysis is to organize these functions hierarchically according to parent child relationships. Figure 13 shows the resultant Functional Hierarchy for the CBM Prototype Data Warehouse.



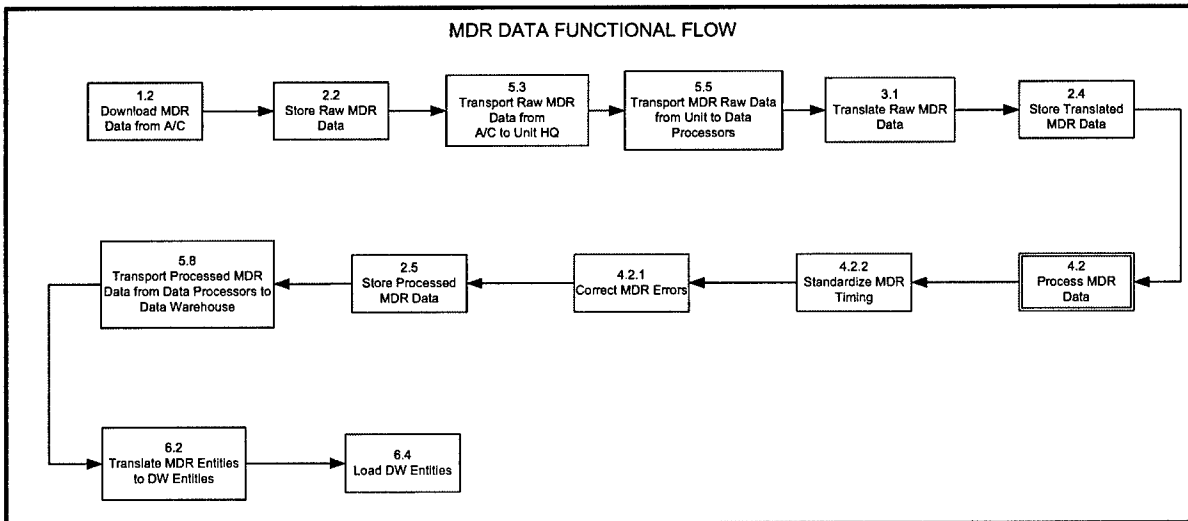
**Figure 13 - Data Warehouse Functional Hierarchy**

### 2.4.3 Functional Flow Analysis

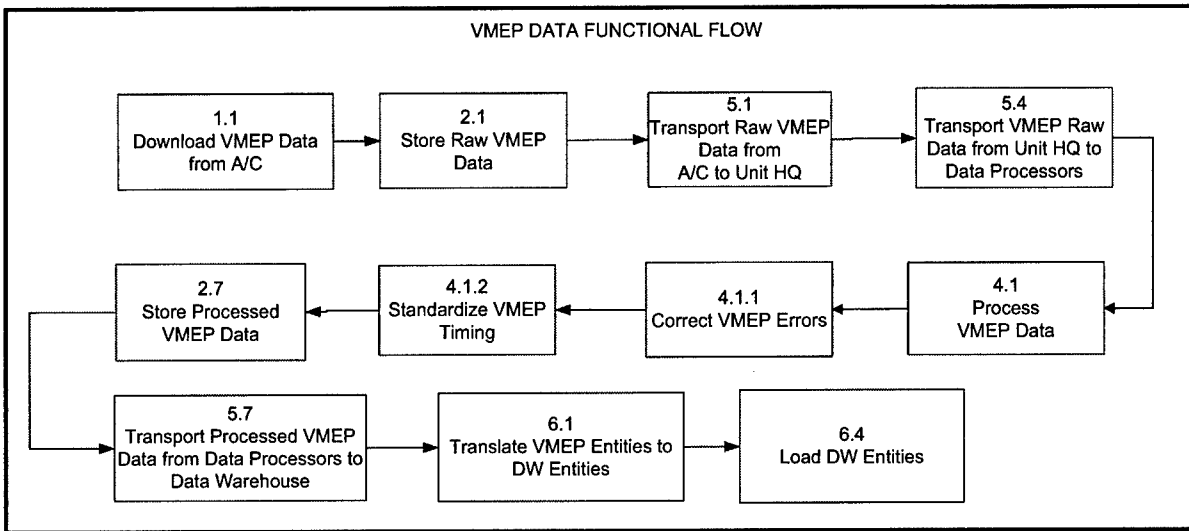
The final step of the functional analysis is to organize the functions into the sequence they will follow in the data warehouse information system. The resultant top level functional flow diagram is shown in Figure 14. Figures 15 thru 17 show sublevel functional flow diagrams focusing on specific data sources.



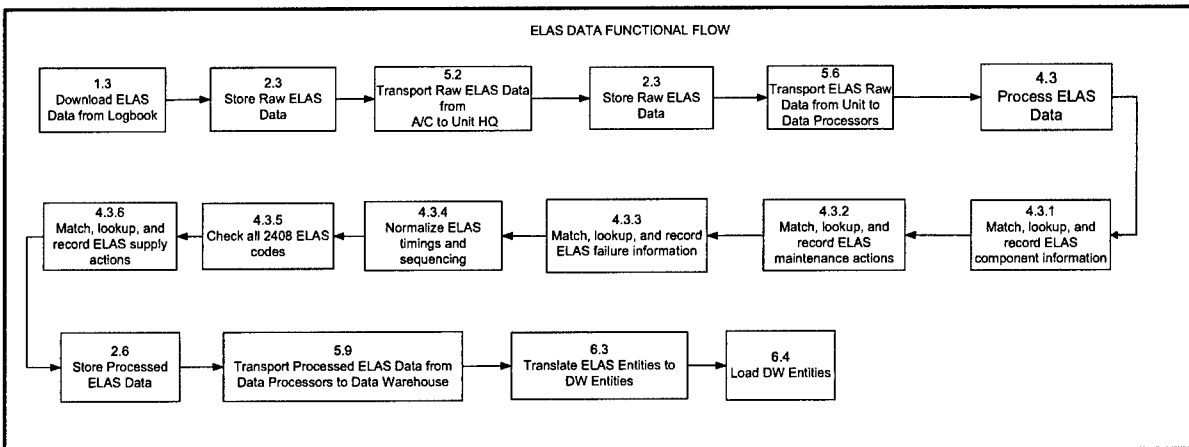
**Figure 14 - Data Warehouse Functional Flow**



**Figure 15 - MDR Data Functional Flow**



**Figure 16 - VMEP Data Functional Flow**



**Figure 17 - ELAS Data Functional Flow**

## 2.5 Revised Problem Statement

At the end of the Needs Analysis Process we arrive at a Revised Problem Statement. This revised problem statement captures the essence of the engineering design task at hand, sets the scope of the system, and reflects the major needs, wants, and desires of our stakeholders.

The Revised Problem Statement for the CBM Prototype is:

*Develop a data warehouse for the CBM Prototype. This warehouse shall include all relevant and available state, vibration, and maintenance information from designated Army units. Design a management plan for this data including translating and loading of the data into the data warehouse. This data warehouse must be scalable and support design iterations beyond the CBM Prototype. The data warehouse will combine diagnostic, configuration, and maintenance data to form a composite investigative picture at any point in a component's lifetime. This data warehouse shall provide sufficient information to major stakeholders that enable development of detailed diagnostic and prognostic models to support CBM.*

### **3. Design & Analysis**

#### **3.1 Design & Analysis Overview**

After completing the Problem Definition phase of our design process, we next turn to the Design & Analysis phase of our design process. In this phase, we will first develop and analyze the prototype logical and physical architectures supporting the CBM Prototype Data Warehouse. We then introduce our source data management design and our extract, transform, load design.

#### **3.3 Software Architecture Design**

After a thorough review of our prototype data sources, we are ready to begin our software architecture design. The software architecture design for the CBM Data Warehouse consists of all software-based systems required by the data warehouse. This includes source data products, offline data stores, database systems, and software processes used to extract, translate, and load (ETL) source data. Implementations of these software processes might range from commercial off-the-shelf software solutions to custom built applications and routines.

Our software architecture includes two primary designs – logical and physical. The logical design consists of an abstract representation of the entire data warehouse as well as object and relational models for data staging, ETL processing, and eventual data storage. The physical design represents a set of products that establishes the formal software definitions of the logical

model and support easy implementation. Both the logical and physical models are defined in sections 3.3.1 and 3.3.2 below.

### 3.3.1 Data Warehouse Software Logical Design

Figure 18 describes the high-level logical design for the CBM prototype data warehouse. This figure shows an overall data warehouse divided into two primary logical partitions – a pre-processed partition and a unified partition. Each of these partitions plays an important role in meeting the needs of the stakeholders described above.

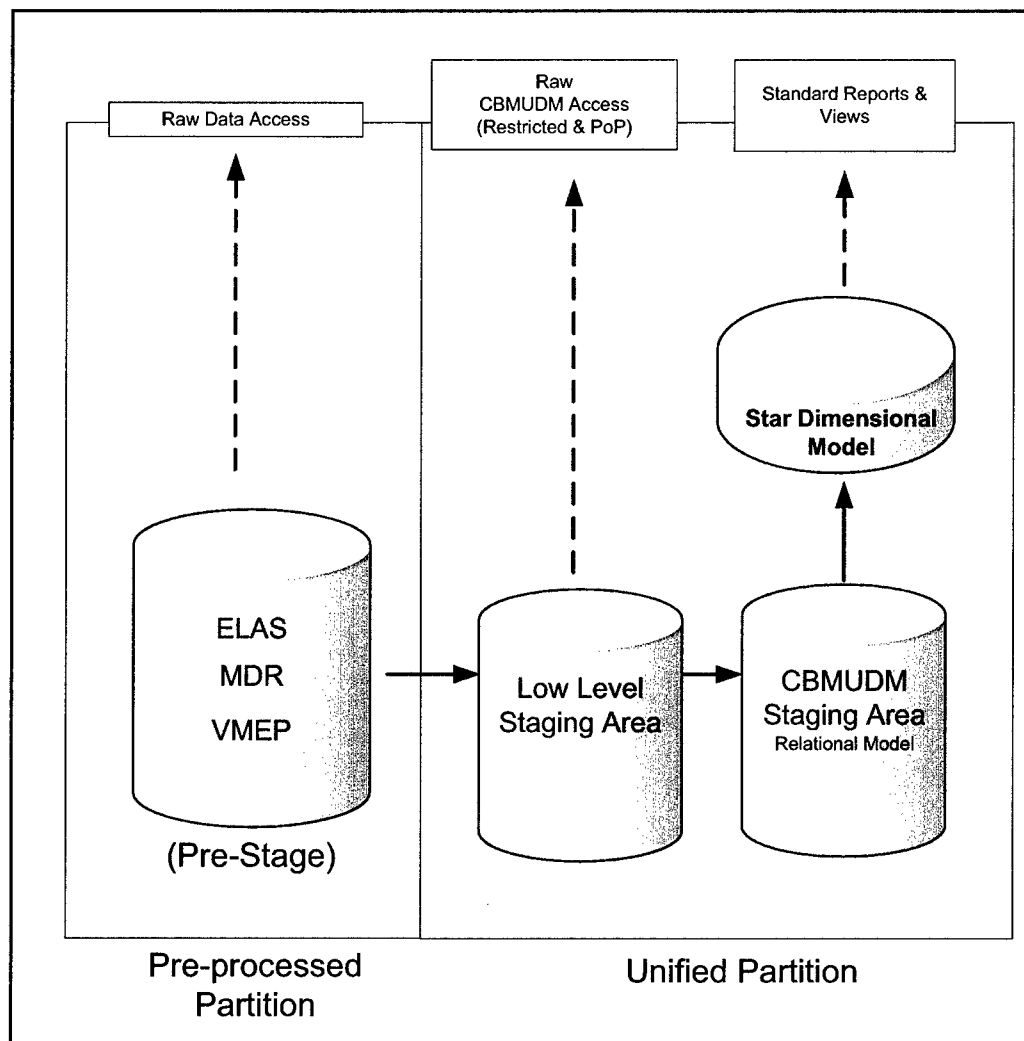


Figure 18 – High Level CBM Data Warehouse Logical Design



The pre-processed partition, or P3, is a “raw” data store area used to collect source data. The P3 is designed to fulfill two primary purposes. First, the P3 provides a single contiguous area where all the source data can be stored for further processing. This centralization of source data greatly simplifies the data management and ETL processes described in subsequent sections. Second, the P3 immediately satisfies the stated need of engineers, analysts, and decision makers to have access to source data for the CBM Proof of Principle data analysis tasks described in the introduction.

Data in this area satisfies one requirement – it must be readable by commercial off-the-shelf analytical tools such as MS Excel or Matlab. The data is deemed “pre-processed” because it is stored only within native data contexts, and is not combined or normalized. Likewise, source-data schemas and granularity are maintained, and no data cleansing or error checking is performed.

It is important to note that, because the P3 does not call for data cleansing or normalization, it might be implemented in any number of ways. These might range from a set of flat-files on a computer file share to binary files stored inside a database. It is also important to note that the P3 is only open to use by engineers and other stakeholders during the prototype phase of the CBM data warehouse. In an eventual CBM data warehouse implementation, we will want to restrict views of source data to the unified partition. This is to avoid users having potentially conflicting views of the information stored in the same data warehouse.

The unified partition of the data warehouse represents the area where all source data is combined into a unified representation of the complete aviation maintenance system. This area consists of three primary layers. The base layer is a low-level stage where data is loaded from the P3 into actual database structures in the implementing database system. The purpose of this layer is to facilitate loading within an implementing database system.

The middle layer, or CBM Unified Data Model (CBMUDM), represents a relational data structure where source data from the low-level staging layer is combined into a single-unified set of related database objects. Here, we have made a deliberate and careful decision to develop a relational staging area. Despite the enormous effort that will be involved in designing and implementing the CBMUDM, we believe it is essential to combining all data sources [17]. The purpose of this layer is to allow related data from independent data sources to be combined and collated. For example, aircraft part data taken from an independent set of maintenance records is

paired with pertinent sensor data taken from independent sensor data records. Because the CBMUDM is relational and involves complex, slow queries to access data, it is only used for staging purposes.

The top layer, or presentation layer, represents optimized data structures used to view the information in the data warehouse. This layer is based on efficient dimensional and cube modeling structures designed to satisfy specific stakeholder needs. It is a read-alone based information repository, and built from queries ran against the CBMUDM layer. It is the primary source of information provided to the stakeholders.

### 3.3.1.1 Low-level Stage Logical Design

The low-level stage is designed as an area where source data from the P3 can be loaded into database objects. This layer consists of flat database structures that loosely correspond to the individual data source schemas. Some relational modeling is done at this level, but only enough to facilitate efficient data loading.

The low-level stage design is broken into three sub designs– MDR, VMEP, and UniRAM. The MDR logical design consists of three entities. The MDR Parameter Entity models the meta-data for each MDR parameter – description, units, minimum value, maximum value, etc. This allows us to load each parameter’s meta-data once, and not repeat it for each entry of actual MDR Data. The MDR Data Entity models the actual MDR data recordings. Here we store a foreign key linking the data to its corresponding parameter information in the MDR Parameter Entity. We also record the data’s recorded value, the start date/time of the recording, and the end date/time of the recording. We add the concept of an end time to facilitate future efforts to address the discontinuities in the MDR data set described in Section 2.3.2.1. The final entity in the MDR low-level stage logical design is the MDR Mission table. This is where we record information common the the entire MDR usage period, such as aircraft identification, usage period start time, and usage period end time.

The VMEP logical design is very similar to the MDR logical design. The VMEP Parameter entity stores meta-data about each VMEP parameter or CI – CI name, description, units, etc. The VMEP Data Entity stores the actual VMEP recorded data with start and end date time groups. The VMEP Mission Entity tracks information about the entire VMEP usage period.

The UniRAM logical design is an exact copy of the current UniRAM schema. Because UniRAM is a mature information existing within an actual database, this data is already modeled and loaded by technicians at Fort Rucker.

Our other relevant on-change data sources, described in Section 2.3.2.5, are modeled in our low-level stage as comma delimited files. These files are created by third-party tools, such as MS Excel or MS Access, and serve as direct inputs to our extract, transform, and load process.

### 3.3.1.2 CBMUDM Logical Design

The construction of the CBMUDM naturally flows from the Affinity Diagramming process conducted during our Problem Definition Phase. We designate the major group headers and ungrouped objects of our Affinity Diagram (Figure 12) as entities in our model. We then revisit the data sources and stakeholder interviews at a much finer level of detail and identify attributes for the various entities and identify the relationships between our chosen entities. This is a largely iterative process where we continually review the results with subject matter experts and the stakeholders to ensure our model captures all pertinent information in the Aviation Maintenance System. Our resultant logical model for the CBMUDM is an Entity-Relationship (ER) diagram located in illustrated in Appendix G. In the interest of brevity, we have only included pertinent attributes in the ER diagram. Each of the model's entities is discussed below.

The Component Entity represents the central element of our model. It is the object driving the entire shift to Condition Based Maintenance. Each component is a specific physical part in the Aviation Maintenance System. It contains attributes used to describe an individual component such as serial number, manufacturer lot number, and component weight.

The component maintains a reflexive relationship with other components. This allows us to capture the hierarchical installation history of components that are sub-elements of larger components. For example, an engine turbine section might be a sub-component of an aircraft engine. The reflexive component to component relationship allows one to track what particular engine contained a particular engine turbine section, and when the turbine section was installed or removed.

The End Item Entity maintains an "is-a" relationship with the Component Entity. An end item is a specialized component that represents the top-level component in a component hierarchy. This entity allows us to query information about an end item without doing a complex

join on the larger component entity. For scalability reasons, we term this object as an “end item” to allow our CBMUDM model to be extended to any Army system – aircraft, truck, tank, missile, etc. The specialized Aircraft Entity in our model allows us to capture attributes specific to end items classified as aircraft (e.g. aircraft status, current operating hours, etc).

Each Component Entity in our model instantiates a General Component Entity. This very important entity describes the set of all abstract components that *might* occur in various facets of the Aviation Maintenance System. This modeling of hypothetical components is required for several reasons. First, it allows us to model information common to all components of a certain type. For example, there is certain information common to all UH60 aircraft transmissions that we want to model. Procurement personnel may want to track a list of all possible manufactures for the transmission. Maintenance planners may want to capture a list of standard transmission repairs they might encounter with any transmission. Finally, analyst may want to view a list of sensors that report information about all transmissions. The general component entity allows us to capture this type information.

The second reason we need the general component entity is to capture components in the system that will eventually show up as specific components. For example, a crew chief may determine that a specific serial-numbered gear box has failed on an AH64D helicopter. To fix the repair, the crew chief needs to know what components are generally required to fix the failed gearbox – e.g. a new gearbox and new mounting hardware. The crew chief can then requisition these general components through the supply system. Until specific parts are shipped from a supply depot to fulfill the supply request, we need a way to capture the concept of the replacement parts. The general component entity allows us to handle this situation.

The Unit Entity allows us to track which particular organization possesses or “owns” a component. A unit represents actual operational Army units to include supply depots and maintenance facilities. This information is useful in determining where a component is physically located (i.e. what transmissions are in Afghanistan) as well as where a component has been in the past.

The Manufacturer Entity allows us to track information about what particular manufacturer supplied the component to the Army. This information is invaluable to logistics planners, reliability engineers, and safety investigators.

The Usage Period Entity records the individual uses of the aircraft or end item. This allows us to record when, and for how long, the end-item was used. A usage period might correspond to a full two-hour mission, or a simple fifteen minute maintenance operational check.

The State Descriptor Entity is used to capture the data describing the Usage Period and General Component Entities. State descriptor data ranges from the temperature of a nose gearbox to the bank angle of the aircraft in flight. The relationship between the State Descriptor entity and the Usage Period Entity allows us to capture specific state descriptor recordings during a specific usage period. For example, we can record all left hand nose gearbox temperature values for AH64D #446 during a three-month period. By using the relationship between End Item and Component, we can burrow down and match these temperature values to the specific serial numbered nose gearbox (or gearboxes) installed on AH64D #446 during the same period.

The relationship between State Descriptor and General Component allows us to record what state descriptors generally describe a particular component. For example, for all CH47 transmissions, we might have four state descriptors that provide relevant information – transmission oil temperature, transmission oil pressure, transmission oil level, and transmission vibration. This information is useful to analysts who want to see what types of data are reported for certain components.

The most important feature provided by the State Descriptor entity is its ability to standardize data from disparate Digital Source Collectors mounted on aircraft. A Digital Source Collector (DSC) is any aircraft sensor that provides information about aircraft components. As of this writing, there are literally dozens of different DSC's, each manufactured by different vendors, and each with its own native data schema and data protocols. Many of these different DSC's track information about the same set of components. Combining information from these non-standardized data collection devices has been problematic for the aviation community [5]. The State Descriptor Entity allows us to combine data from any of these DSC's into a common logical object.

In some respects, state descriptors are actually time variant attributes. However, following the rules for entity selection outlined in [16], we decided to track state descriptors as separate entities as opposed to object attributes for two reasons. First, state descriptor information will serve as both dependent and independent variables in component failure analysis. Because of

this fact, researchers and analysts will want constant access to this data. Second, state descriptors are used to describe several other entities in or model.

One of those entities is the Flight Regime Entity. A flight regime (or maneuver) is defined by an ordered combination of certain state descriptor trajectories experienced in flight. For example, a right turn might be defined as the aircraft attitude (as measured by on board sensors) experiencing a 10 degree right bank for more than 30 seconds. Several CBM Prototype stakeholders specifically mentioned this entity during our stakeholder analysis.

The Failure Entity is used to capture the concept of a degraded component. A failure is a specific failure event related to a specific component. For example, if a night-vision site on a specific AH64D fails in flight, then we would generate a specific failure for this event.

Each failure is described by one or more Failure Mode Entities which serve as standardized objects for categorizing component degradation. The failure mode allows us to specify exactly what we mean by a "failure." This entity is needed for several reasons. First, several stakeholders expressed dismay at the lack of failure specificity provided in the current Aviation Maintenance System. Simply saying a component "failed" is often times not enough information to conduct meaningful analysis. For example, if the night-vision system for an AH64D fails in flight, the pilots might report "night vision system unusable for flight." This is sufficient information from the pilots' perspective, as the system simply isn't working. However, there are several different ways the night-vision system could become "unusable." Perhaps the night-vision picture went black, or maybe it turned solid green, or maybe it was just too dim for effective use. From a component and failure analysis perspective, each of these represents a distinct failure mode of the system requiring independent analysis. Current failure information that exists in the Aviation Maintenance System is largely based on the pilot's or unit's perspective, forcing engineers and analyst to combine very different failure modes into a single aggregated definition of failure.

The second reason we need a Failure Mode entity stems from the way failure modes are ascertained at various levels of repair in the Army Maintenance System. Because of the level of repair for the night-vision system, the actual nature of the failure might not be known until the system is rebuilt at a repair facility. This opens up the possibility that two descriptions for the same failure are entered into the Aviation Maintenance System for the same failure – one related

to the pilots perspective and one from the repair facility perspective. The pilot reports an “unusable system” when the factory reports “failed signal processor.”

A third reason we need a Failure Mode entity relates to the way the current Aviation Maintenance System (TAMMS-A) standardized failure codes. Current maintenance policy as defined by DA PAM 738-751 provides for 216 standardized codes describing failure. These range from “Incorrect Antenna Gain” to “Buckled or Twisted.” However, this is a relatively limited number of codes given the potentially thousands of specific failure modes across the entire fleet of aviation components.

The Failure Mode entity addresses these issues. First, the Failure Mode Entity allows for a very specific definition of failure modes because each failure mode in the CBMUDM is described by one or more state descriptors trajectories. For example, in the night-vision site scenario, one failure mode might be described by a state descriptor measuring the night-vision power supply voltage below some nominal value. By using state descriptors to describe failure modes, we can encapsulate all the existing failure codes in DA PAM 738-751 as well as any failure code imaginable. Second, the many-many relationship of failure event to failure mode allows us to handle the situation of different levels of repair providing more detailed information about the same failure.

When a failure occurs, it is addressed by a Maintenance Action entity. A maintenance action is any maintenance activity (not just unscheduled maintenance actions) and will involve one or more components. A maintenance action might also require replacement of general components, which are in turn satisfied by components in the supply system.

The General Maintenance Action Entity is used to describe regularly scheduled maintenance actions required for component maintenance. This entity also describes prescriptive maintenance actions that might be used to assuage a particular failure mode. This allows us to capture vital planning data, which along with entities such as Tool, General Component (for replacement), Maintenance Personnel, and Publications can be valuable in forecasting maintenance requirements. If we experience an actual failure mode or, more interesting, predict a failure mode based on prognostics, we can automatically plan for its repair. This plan could take the form of a semi-automated P4T2S (Plan, People, Parts, Publications, Tools, Time, Safety) maintenance analysis, a common management practice in today’s Army Aviation community [19].

The Sensor entity is used to model information about DSC's and other sensors that provide information to state descriptors. This entity provides vital meta-data to engineers about the inner workings of each sensor. For example, an engineer may want to find out what vendor manufactures a certain sensor, or view information particular to a certain fielded version of a sensor.

### 3.3.1.3 Star-Dimensional Logical Design

The star-dimensional layer of our overall logical design is an efficient, read-only presentation layer that will serve as the primary mechanism for accessing the data warehouse by stakeholder. This layer is largely designed for future versions of the CBM Data Warehouse, when stakeholders start regular access to the warehouse. We feel that, for purposes of the CBM Prototype proof of principle, the CBMUDM layer can provide most the information for the demonstration. Therefore, this layer is beyond our original scope of work. However, we will provide a cursory review of what future designs of this layer might look like in the future.

At this level, we envision a set of independent dimensional models specifically designed to address common stakeholder needs. These models will largely follow techniques described by Kimball [17]. We will describe and analyze one such example model here.

Several of our stakeholder expressed interest in being able to examine usage/state data for components. These stakeholders want to be able to examine the following for any component on the aircraft – unit information, aircraft information, and usage/state indicators trajectories at any point in the component's life.

At the center of the star-dimensional model is the Component State fact table. This fact table contains foreign keys to the following dimensions (each taken from the CBMUDM layer) – Unit, Component, State Descriptor, and Usage Period. The fact table also contains an attribute for state descriptor values, start DTG for the state descriptor value, and end DTG for the state descriptor value.

Each row in the fact table corresponds to an individual state descriptor value and its start and end DTG. For each of these values, we record the foreign keys to the following entities - the usage period when it was recorded, the components it monitors, and the unit that owned the aircraft.



This model would allow engineers to query the component state information in a variety of ways – by unit, aircraft, component, state descriptor, or time period. These queries, involving only single-level joins built off binary indices, would be very efficient. However, they would also involve a tremendous volume of information. The following back of the envelop calculation demonstrates this point:

*1 unit X 24 aircraft per unit X 1400 components per aircraft X 5 state descriptors per component (AVG) X 20 usage periods per month (AVG) X 123 state descriptor entries per usage period (AVG\*) = **413 Million fact table entries per month***

*\*Based on MDR analysis at Appendix D*

This calculation demonstrates the heavy storage cost involved with providing efficient access to the CBM Data Warehouse. It is clear that future versions of the warehouse will grow to terabyte levels if efficient access to the data is desired.

### **3.3.2 Data Warehouse Physical Design**

We produced physical designs for both the low-level stage and CBMUDM. These designs specify the database objects required to implement the logical design in an actual database architecture (Oracle, Sybase, MS-SQL, etc). This design includes table definitions, comments, specification of table attributes, primary and foreign key identification, and specification and implementation of relationships.

#### **3.3.2.1. Low-level Stage Physical Design**

Appendix H contains the physical design for the MDR and VMED portions of the low-level stage. Readers are referred to Appendix F for the UniRAM portion of the physical design.

#### **3.3.2.2. CBMUDM Physical Design**

Appendix I contains the physical design for the CBMUDM.

### 3.4 Source Data Management Plan

The data management design describes the general process used to gather source data from various disparate data sources and load it into the data warehouse. This includes how data is downloaded, copied, moved, translated, and loaded. Our source data management plan only includes those data source for the CBM prototype that provide frequent and dynamic data – state and usage data from MDR, vibration data from VMEP, and maintenance data from UniRAM.

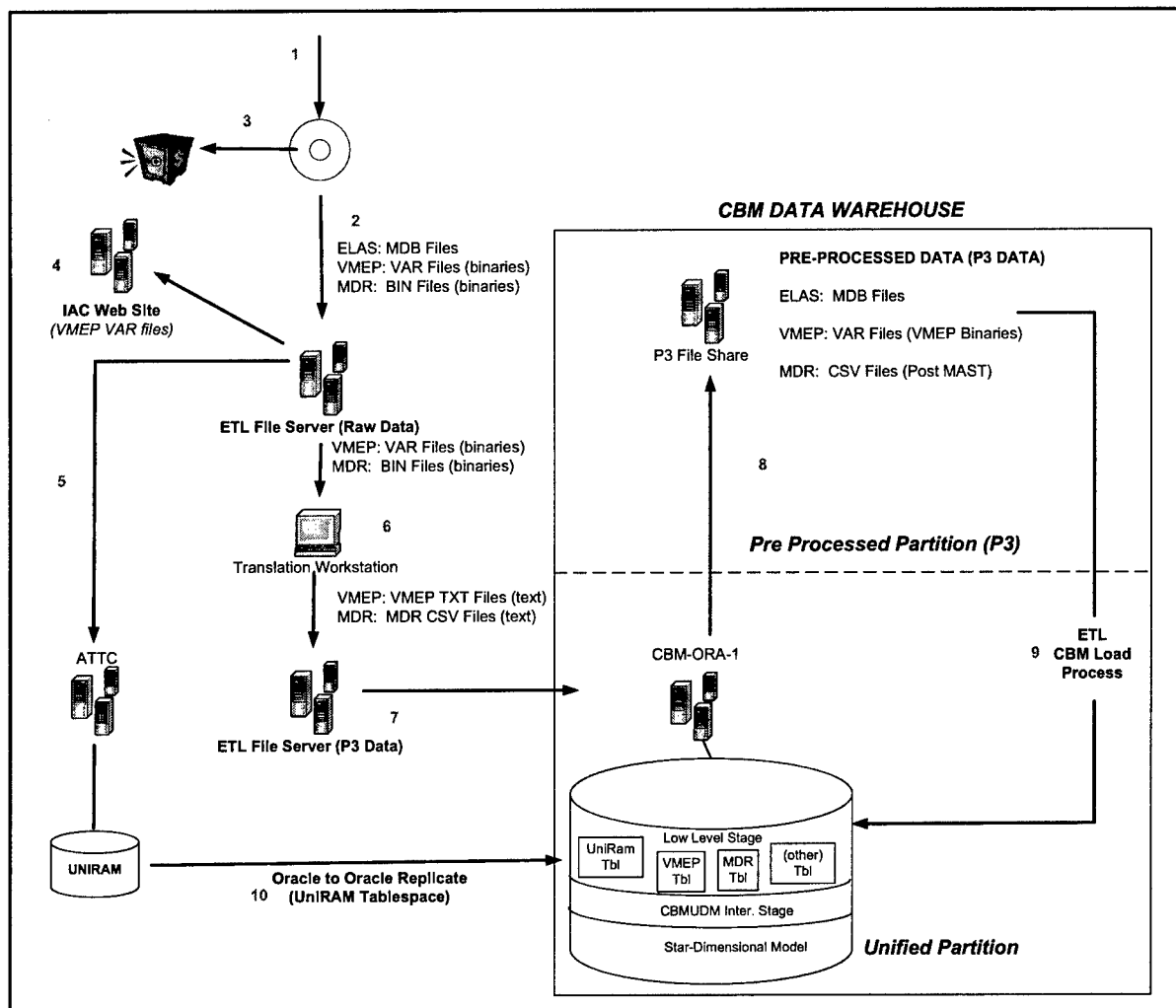
Our data management plan is a detailed elaboration of our functional analysis conducted in the Problem Definition Phase of our design process. It describes how the functional flow should be implemented to achieve the functionality of our system. Figure 19 shows an overview of our data management plan. This plan is broken into ten steps, each shown in a square labeled with a number. We briefly describe each step below.

STEP 1 - Receive Raw Data. This data management step represents Functions 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 5.1, 5.2, 5.3, 5.4, 5.5, and 5.6 in the functional analysis. In this step, raw data is received from the field, most likely on compact disk media. In the future, this data transfer may occur over Army networks. The agency receiving the raw data is primarily responsible for preparing the data for loading into the data warehouse.

STEP 2 - Upload Disk to Temporary File Server. This step corresponds to Functions 2.1, 2.2, and 2.3 in the functional analysis. In this data management step, the receiving agency temporarily stores the raw data to local storage for further processing.

STEP 3: Secure Original Disks. This data management step (Functions 2.1, 2.2, and 2.3), represents permanent archiving of the raw data.

STEP 4: Upload VMEP Data to VMEP Data Store. This step represents Function 2.7 in the functional analysis. In this step, the receiving agency uploads to VMEP binary files to the IAC Website. The IAC Website is a standard Army repository for all VMEP data from Army Aircraft.



**Figure 19 - CBM Data Management Plan**

**STEP 5: Upload ELAS Data to ATTC.** Here, we are concerned with getting the raw ELAS data to ATTC at Fort Rucker so they can perform all ELAS processing. Once ATTC receives the data, they will execute Function 4.3.

**STEP 6: Translate Binary Files.** This data management covers Functions 3.1 and 3.2 in the functional analysis. In this step we are concerned with converting the MDR and VMPE data from their binary formats into text readable formats. For MDR data, we execute the MAST and LIMSSGAS program, which produce text-readable comma separated value files (CSV). For VMPE data, we use the exporttotext.exe utility, which produces text files of the VMPE data.

STEP 7: Upload Pre-processed Data to Data Warehouse. This step corresponds to Functions 2.5, 2.6 and 2.7. This step represents the loading and storage of all pre-processed data into the data warehouse. We use the term “pre-processed” to indicate all data that is text readable but not correlated in a unified fashion.

STEP 8: Upload Pre-processed Data to Data Warehouse Pre-processed Partition. In this step, largely an extension of step 7, we store the text readable files in the pre-processed partition of the data warehouse. This allows engineers and analyst to immediately use the raw data, albeit in a non-unified and uncorrelated form.

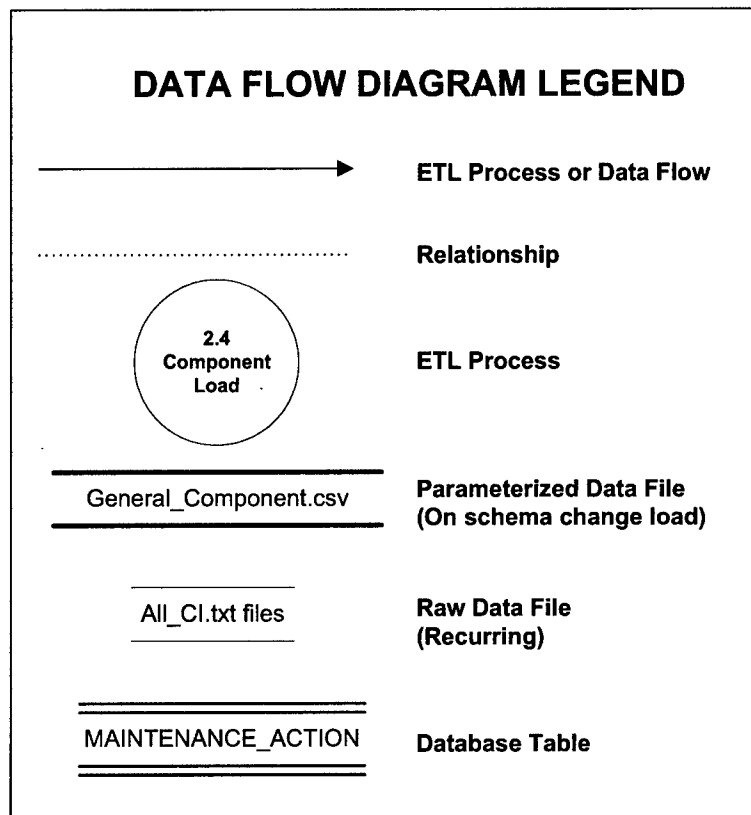
STEP 9: Execute Extract, Transform, Load Processes. This data management step covers Function 6.0 in the functional analysis. In the step, we begin loading the unified partition and convert source data entities to CBMUDM layer entities. This step begins with loading raw data into the low-level stage and ends with source data objects translated to unified objects in the CBMUDM. This process is described in more detail in Section 3.6 below.

STEP 10: Replicate UniRAM Data. In this data management step, covered under Function 5.9 of our functional analysis, the post processed UniRAM data is transferred directly into the low-level stage of the data warehouse.

### **3.6. Extract, Transform, Load Design Processes**

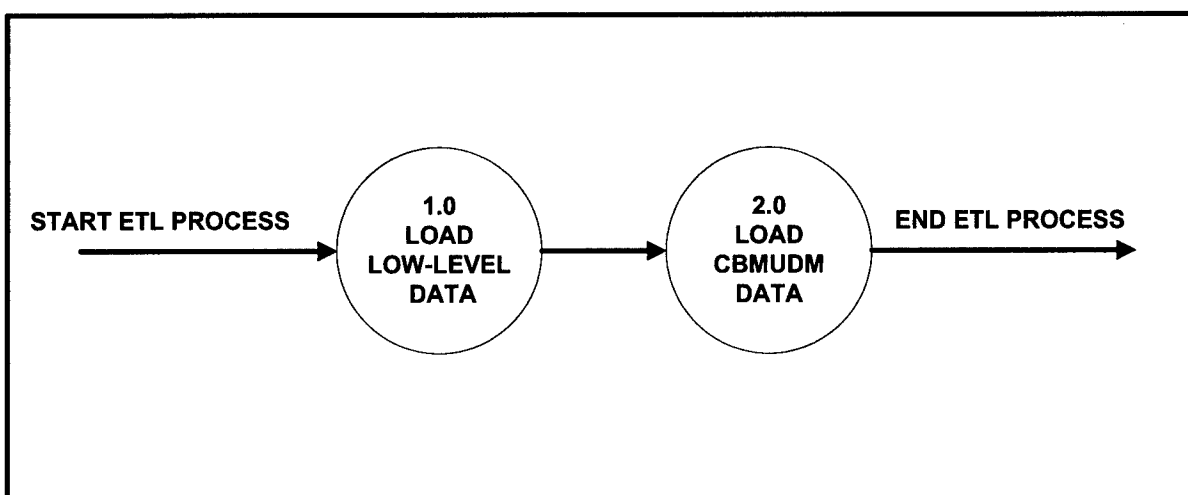
A significant part of our research involved an actual design of the extract, transform, load mechanisms (ETL) to transfer data from source data schemas into the unified CBMUDM. This represents Step 9 of our data management plan. In this section we will outline the general information processes required to populate the unified partition of data warehouse. It is important to note that these are independent processes, and might be implemented with custom software routines, off-the shelf ETL software, or other implementations.

We will use a series of *data flow diagrams* to describe our ETL design. Figure 20 lists the legend for these data flow diagrams.



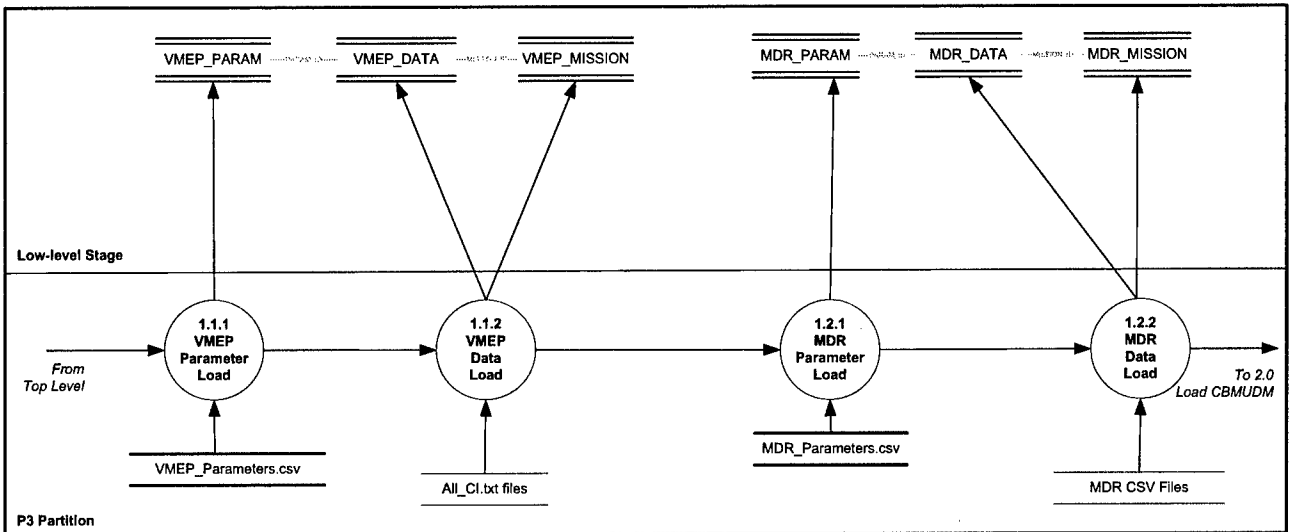
**Figure 20 - Data Flow Diagram Legend**

Figure 21 shows our top level ETL processes.



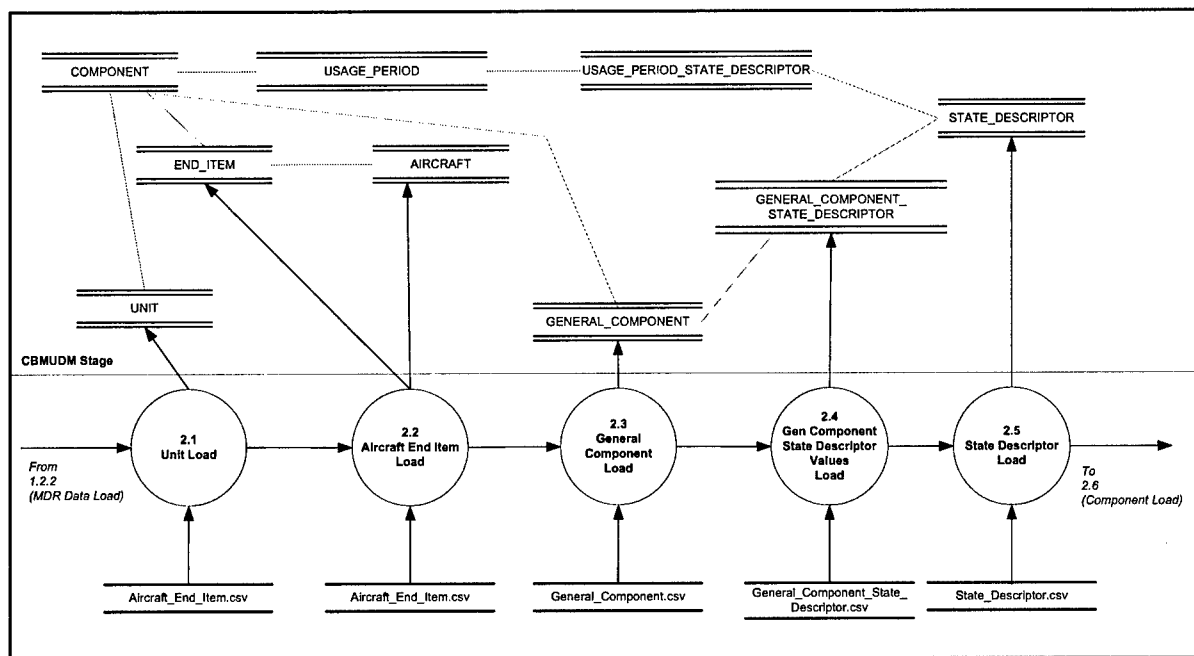
**Figure 21 - Top Level ETL Processes**

Process 1.0, Load low-level data, is responsible for loading the pre-processed data into the low-level stage. Process 2.0 is responsible for loading the data from the low-level stage to the CDMUDM stage.



**Figure 22 -- Low-level Stage ETL Processes**

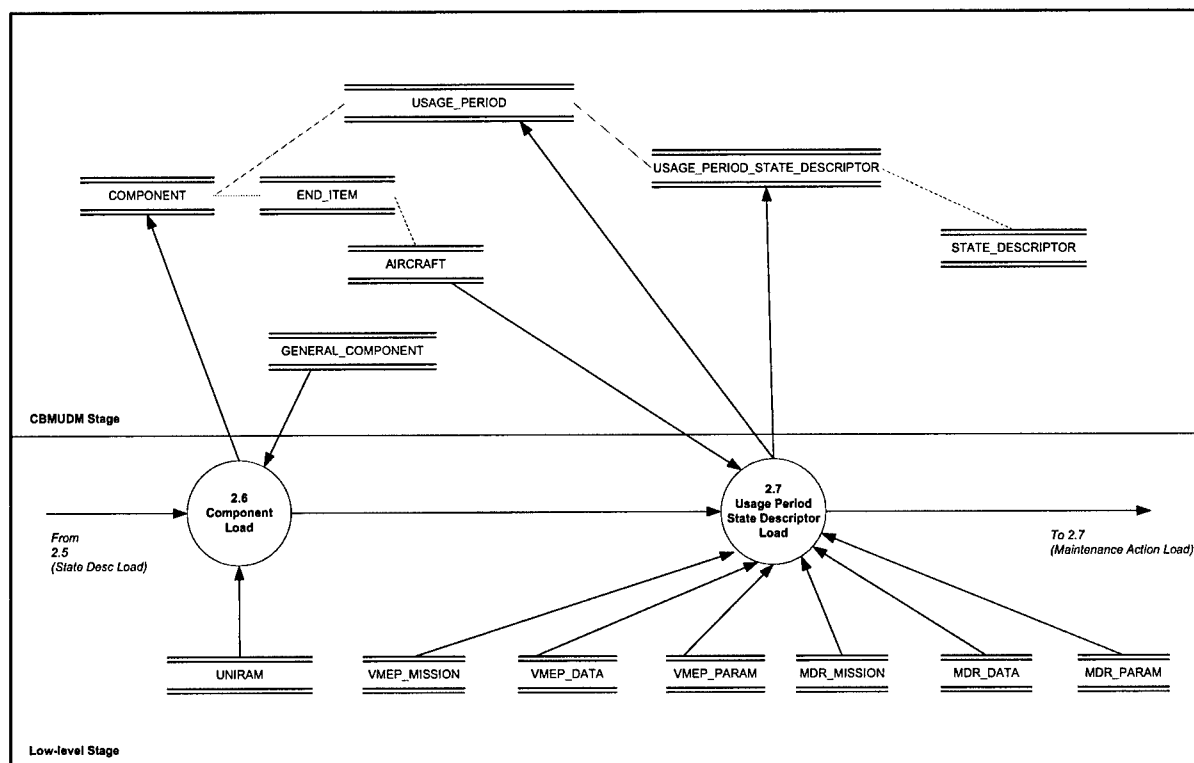
Figure 22 shows the ETL processes for the low-level stage. Process 1.1.1 (VMEP Parameter Load) loads meta-data about the various VMEP parameters, such as CI identifier, units, etc. This data originates in an MS Excel generated flat CSV file, and is stored in the VMEP\_PARAM table. Process 1.1.2 (VEMP Data Load) loads the individual data files. For each VMEP data file (All\_CI.txt), the process creates a “VMEP Mission” which corresponds to an individual VMEP usage period. It then creates one row per CI reading in the VMEP\_DATA Table. Please refer to Section 3.3.1.1 for more details about the low-level VMEP schema. Process 1.2.1 and 1.2.2 perform the same tasks for MDR data.



**Figure 23 - CBMUDM ETL Processes 2.1 thru 2.5**

Figures 23 thru 29 show the ETL processes for the CBMUDM stage. Processes 2.1 thru 2.5 (Figure 23) are simple loaders used to populate several of the on-change entities in the database. The source files for each process are built with MS Excel and MS Access, and are used to load the information in the CBMUDM that is not a continuous update. Sources for this data are discussed in Section 2.3.2.5. Each process generates one row in the corresponding CBMUDM table for each row in the source data file.

Process 2.6 (Figure 24) is used to load all specific components into the CBMUDM. This process mines the appropriate UniRAM tables for all unique components in existence. It then looks up the corresponding general component in the CBMUDM General Component table (using WUC), then adds an entry into the CBMUDM Component table with the matching general component foreign key and specific information about the physical component (serial number, installation history, etc).



**Figure 24 - CBMUDM ETL Processes 2.6 and 2.7**

Process 2.7 (Figure 24) is used to load state descriptor data and match it to the aircraft/end-item usage period. The process first looks up all MDR usage periods (using the MDR\_MISSION table in low-level stage). An entry is then made in the CBMUDM Usage Period table corresponding to the MDR MISSION. Here we are defining a one-one mapping of aircraft usage periods to MDR usage periods. We feel this is a logical choice, as the aircraft as in use any time the MDR is recording data.

For each usage period, Process 2.7 makes entries in the Usage Period State Descriptor table containing the actual state descriptor values (from MDR\_DATA) corresponding to each recorded MDR parameter. The process then looks for matching VMEP usage periods contained within the aircraft usage period. Note, there could be a one-zero or one-many mapping of aircraft usage periods to VMEP usage periods. This is due to several reasons. First, it is possible that the VMEP system was not activated during the usage period (rotor never activated, VMEP control left off). Or, during a single usage period, the VMEP recorder might be cycled by multiple rotor stops and starts.



For each VMEP usage period encapsulated within an aircraft usage period (as defined by MDR usage period), Process 2.7 makes an entry in the Usage Period State Descriptor table containing the actual state descriptor values (from VMEP\_DATA) corresponding to VMEP parameters.

Process 2.8 (Figure 25) is responsible for loading the General Maintenance Action table in the CBMUDM. This process reads a text file containing all general maintenance actions. Process 2.9 loads the General Component Requires General Maintenance table using a similar text file. Process 2.10 loads a list of standard failure modes using a text file of standard failure modes. Process 2.11 loads a text file that maps standard failure modes to general maintenance actions. Note, the aforementioned text files, which are on-change data sources populated manually from hard copy publications, might be replaced in the future pending access to existing electronic data sources in the Army Aviation community. Refer to Section 2.3.2.6 for a discussion about these data sources.

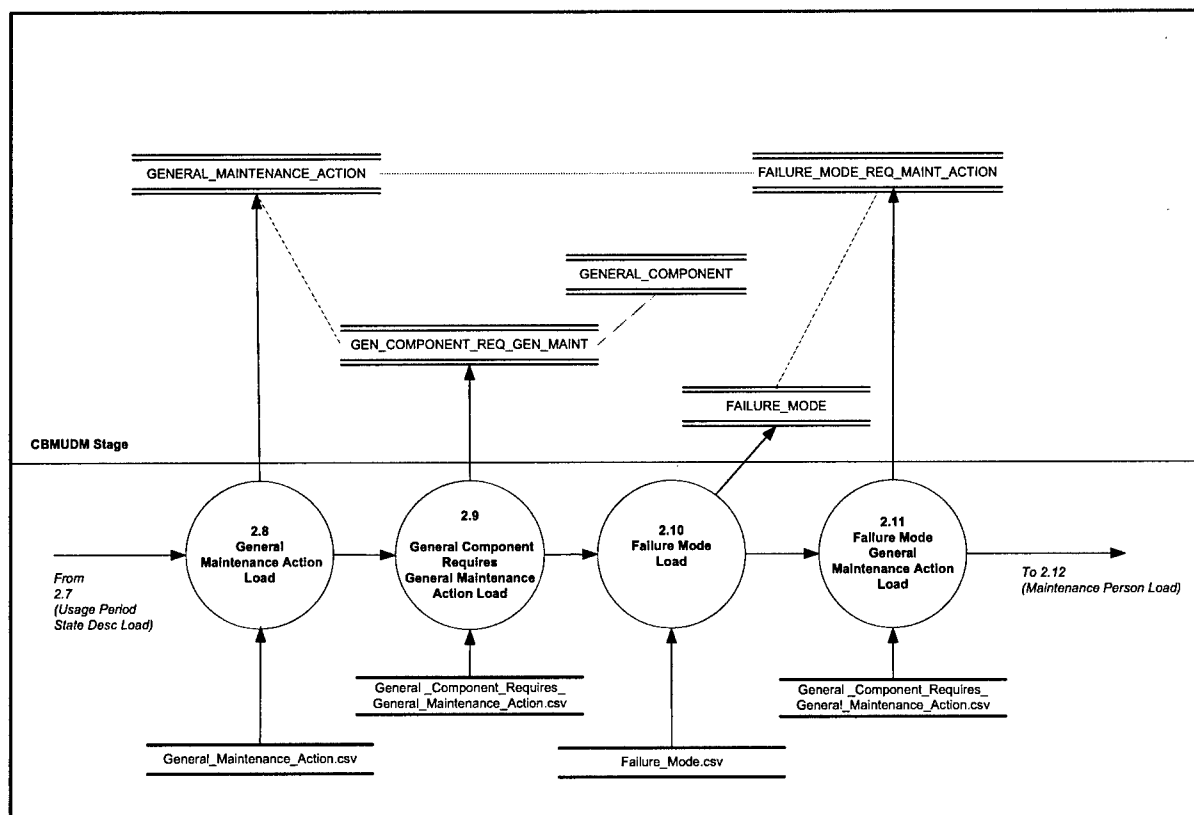


Figure 25 - CBMUDM ETL Processes 2.8 thru 2.11

Processes 2.12 thru 2.17 (Figure 26 and Figure 27) use a similar set of text files to load supporting information for the General Maintenance Action entity. These processes load information tracking what people and tools are required to support a general maintenance action.

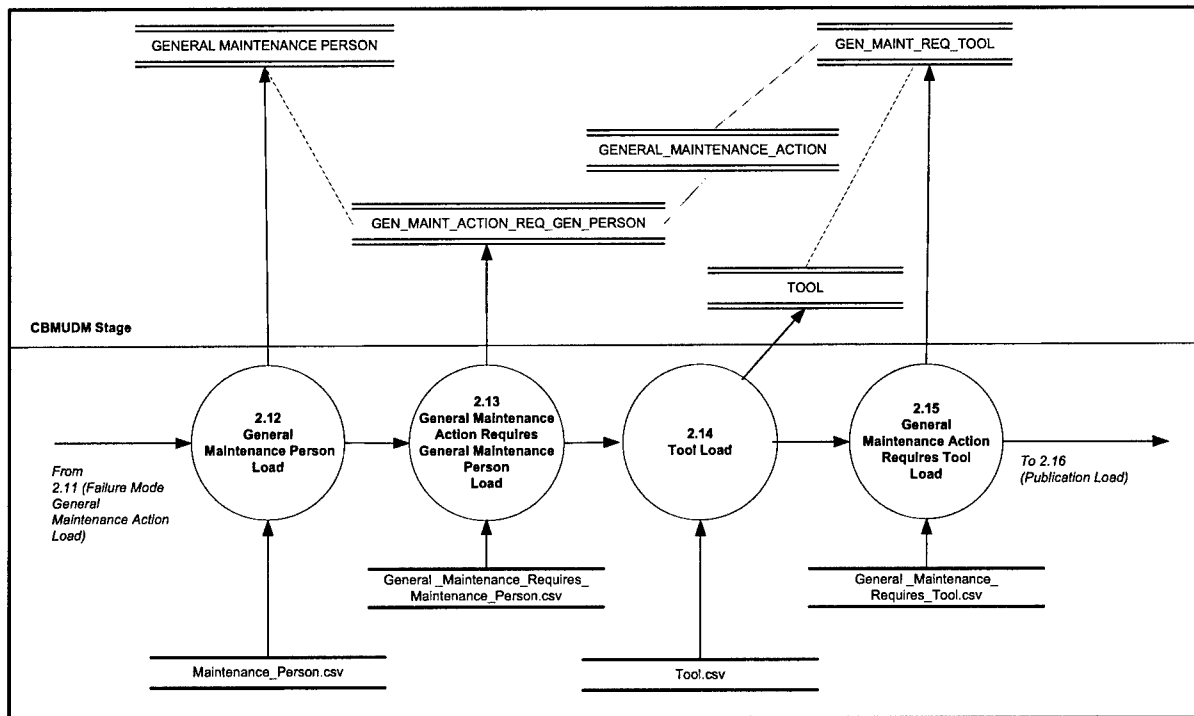
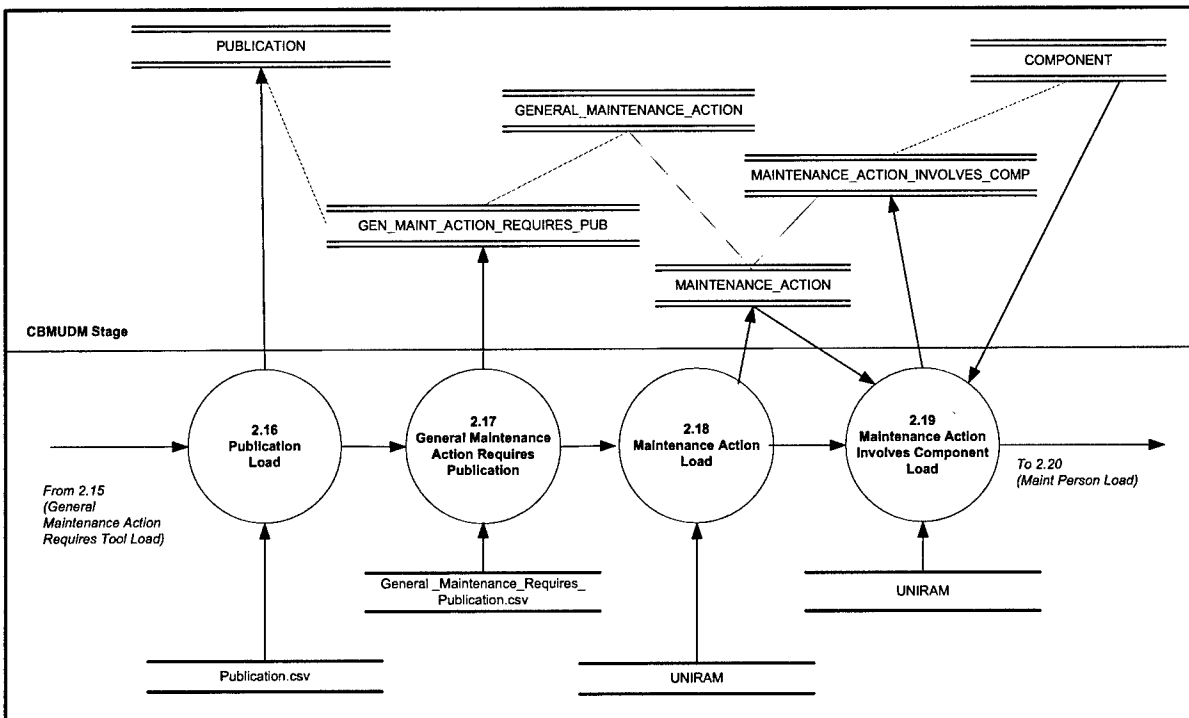
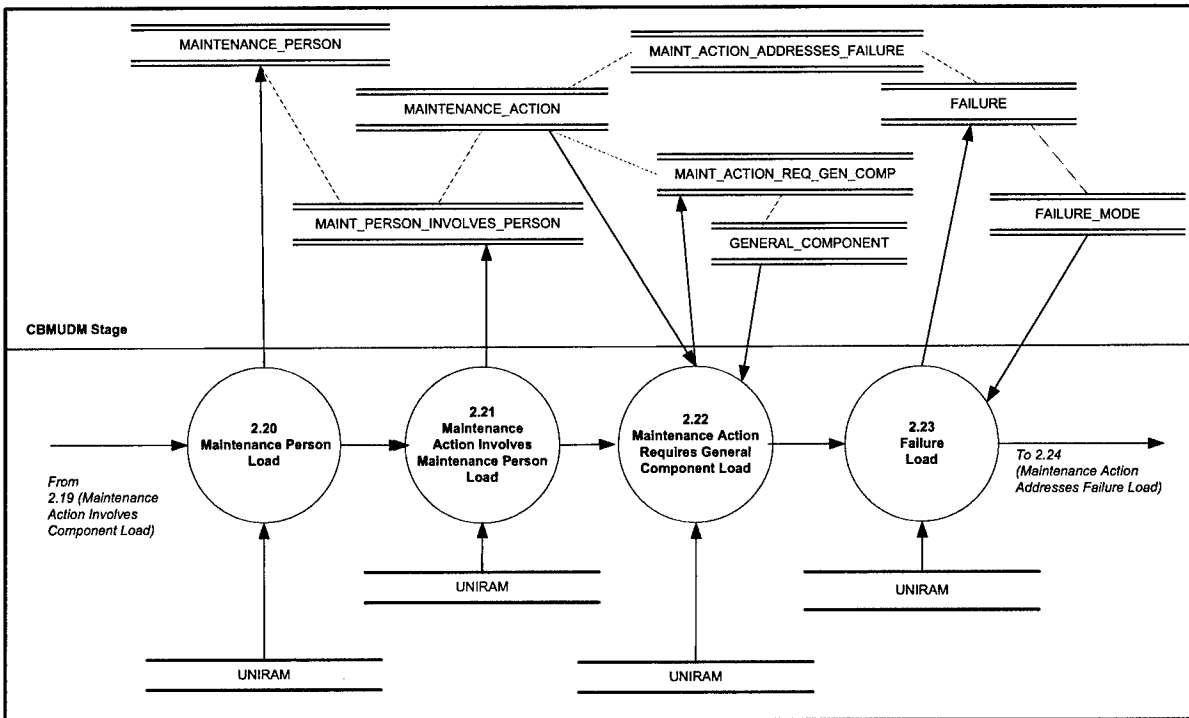


Figure 26 - CBMUDM ETL Processes 2.12 thru 2.15



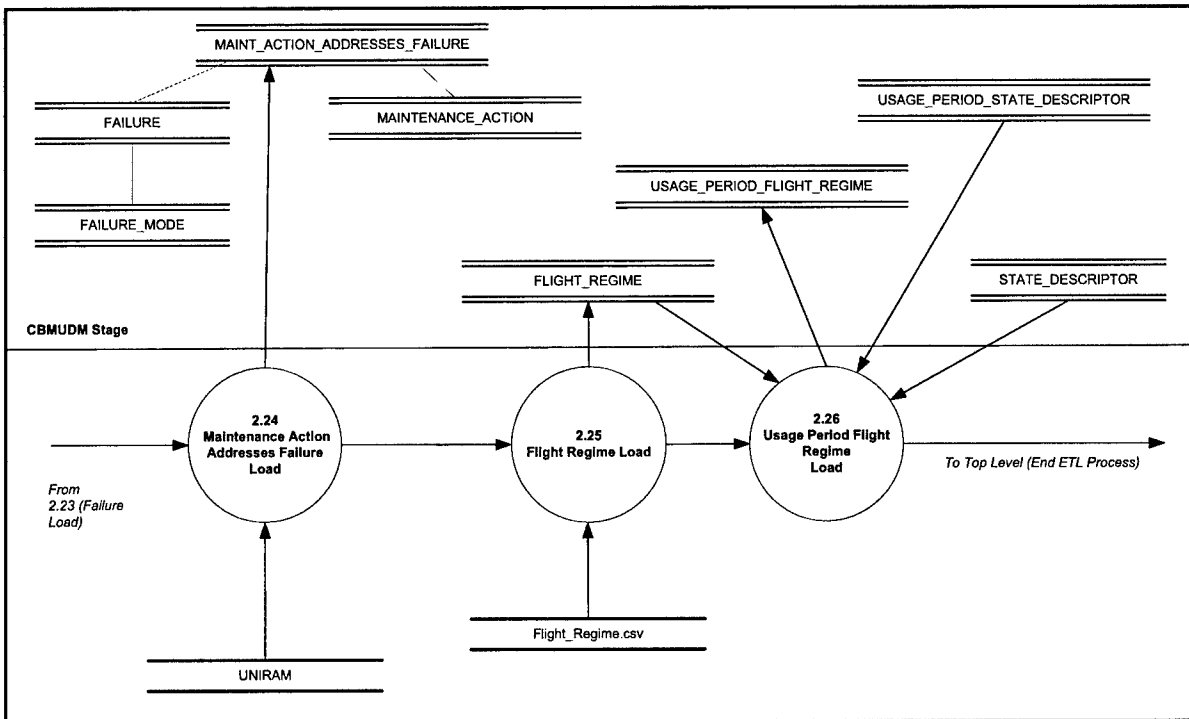
**Figure 27 - CBMUDM ETL Processes 2.16 and 2.19**

Process 2.18 (Figure27) mines the UniRAM database and loads the CBMUDM Maintenance Action with all existing maintenance actions. This consists of inspections, repairs, and other aircraft maintenance activities that were physically performed by the unit. For each of the maintenance actions, Process 2.19 matches the physical components involved in the maintenance action to physical components in the CBMUDM Component table, and records this information in the CBMUDM Maintenance Action Involves Component table



**Figure 28 - CBMUDM ETL Processes 2.20 thru 2.23**

Process 2.20 (Figure 28) mines the UniRAM database for all actual maintenance personnel (by name) involved in maintenance tasks. It then loads this information into the CBMUDM Maintenance Person table. Process 2.21 matches these individuals against actual maintenance actions in the CBMUDM. Process 2.22 is used to track what replacement parts are required for certain maintenance action. This process examines supply information contained in UniRAM, and matches part requisitions against actual maintenance actions. Each part requisition matches a general component in the CBMUDM. Process 2.23 examines each maintenance record in UniRAM, and identifies those maintenance actions that were related to failed or degraded components. It uses failure mode information stored in the CBMUDM in identifying these failures.



**Figure 29 - CBMUDM ETL Processes 2.24 thru 2.26**

Process 2.24 (Figure 29) examines the UniRAM database and maps which maintenance actions were performed to address failures. This process is required because of the way DA PAM 738-751 tracks maintenance records. In the DA PAM 738-751 record system, a source failure and its first prescriptive maintenance action are tracked on the same form. However, for complex failures, many maintenance actions may be required. These secondary maintenance actions are tracked on separate forms, which can appear as individual ELAS entries. Therefore, our ETL process must collect all related maintenance actions that address a single failure and distinguish these from other independent maintenance actions.

Process 2.25 is used to load meta-data about flight regimes into the CBMUDM. This meta-data which describes all possible flight regimes is loaded from a text file. Process 2.26 then examines the State Descriptor and Usage Period State Descriptor tables in the CBMUDM and determines which flight regimes occurred during each usage period, and when they occurred. This information is recorded in the Usage Period Flight Regime table.

## **4. Implementation**

The final phase of our design process is the actual implementation of our physical data warehouse design and data management design. This task was beyond the scope of our involvement. However, we provide the outline of an implementation plan which represents one possible approach to design implementation.

Appendix J contains a detailed example project plan for implementing the data warehouse [20]. This project plan is broken down into the seven phases described below

### **Phase 1 : Hardware And Software Installation**

The purpose of this phase is to install the base software and hardware architecture required to operate the data warehouse. In this phase, we recommend first installing and configuring the development hardware for the data warehouse. This includes installing all hardware, databases, and translation software described in our data management plan.

### **Phase 2: Data Warehouse Configuration & Administration**

The purpose of this phase is to configure the core data warehouse applications needed to maintain the warehouse once it is up and running. This includes security, user accounts, backup, indexing, and logging. We recommend first establishing user accounts on the data warehouse environment. We then recommend designing and implementing job scheduling – which includes back-up/restore processes, database logging, notification, and reporting. We next recommend implementing the back-up/restore processes, and the programming of any regularly scheduled jobs (auditing, record cleaning, etc).

### **Phase 3: Pre-Process Partition Design And Implementation**

The purpose of this phase is to establish the physical implementation of the pre-processed partition of the data warehouse. We recommend first establishing physical locations for storage of all low-level data in an area where it can be accessed by stakeholders. We recommend using a simple networked file system on an existing Army LAN. This phase also includes loading raw VMEP data into the IAC web store (<https://imds.iac-online.com/index.asp>) discussed in Step 4 of the data management plan. This resource is a mature system which can immediately provide

value to our stakeholders. This phase shall be completed when all current field data is loaded into these pre-processed partition.

#### **Phase 4: Post-Process Design Implementation**

The purpose of this phase is to implement the physical design of the data warehouse unified partition. We recommend first implementing ETL Process 1.0 and then using it to load all UniRAM, MDR, and VMEP raw data into a set of independent low-level staging tables located in an industrial strength database environment. We next recommend implementing the physical design for the CBMUDM in the same database environment. We recommend next using ETL Process 2.0 to load data from the low-level staging tables into the CBMUDM physical model. We next propose developing a series of fact tables and dimension (a star-dimensional model) that will be populated from the CBMUDM. We recommend focusing this star-dimension implementation on data requirements common to multiple stakeholders.

#### **Phase 5: Implement Applications**

The purpose of this phase is to construct the applications that will be used to demonstrate the CBM Prototype. We first recommend developing a sample set of cross-cutting use-cases that will best demonstrate the novel capabilities of CBM. We next suggest designing actual applications required to produce these use-cases. These applications might use the dimensions provided by our star-dimensional physical model, ad hoc queries ran against the CBMUDM, or both.

#### **Phase 6: System Integration And Testing**

The purpose of this phase is to integrate and test the complete data warehouse design – population of data into the pre-processed partition, loading of the data into the unified partition, and viewing required information with prototype applications. We recommend first ensuring all current data is loaded into the pre-processed and unified partitions. We then suggest executing these applications, and testing them for the desired functionality.

### **Phase 7 : Implementation**

The purpose of this phase is to implement the data warehouse and end-user applications. We recommend first reviewing and addressing any shortcomings identified in the system integration and testing phase. We then suggest finalizing design changes to the data warehouse and end user applications. We then recommend implementing a regularly scheduled data management routine for load incoming data from the field.

## **5. Recommendations**

Before closing, we offer several recommendations pertaining to the future of CBM Data Management. These recommendations recap many ideas presented in previous sections of this report, and target the data integrity and physical growth of the future CBM data warehouse.

Army Aviation Maintenance Management System Overhaul. In our opinion, many of the complex data management tasks addressed in our design are the result of an outdated maintenance management system. The Total Army Maintenance Management System (TAMMS-A) specified in DA PAM 738-751 is a legacy system developed before the advent of modern information system technologies. This system, based on physical hard-copy records, does not address many of the complex data modeling issues required to achieve Condition Based Maintenance. As a result, any attempt to use information streaming from systems based on TAMMS-A will be clumsy, burdensome, and resource intensive. We recommend further research efforts focus on a redesign of TAMMS-A that fully supports the data requirements of CBM as well as satisfying other requirements of current TAMMS-A stakeholders.

Maintenance Data Entry Overhaul. This recommendation is closely related to the previous, and focuses on the procedures used to enter maintenance and failure data. Currently, the burden for entering low-level detailed information about maintenance actions and component failure information rests solely on operational units. These units are manned with hard working pilots, crew engineers, and technicians whose primary mission is keeping aircraft flying to support on-going operations in the field. These individuals are also responsible for a myriad of other important tasks not related to aviation maintenance. The extra time required to maintain the



meticulous level of data integrity required by CBM is often legitimately sacrificed in the name of operational necessities. Future work must address this issue. Automated systems must be fielded that allow the end-users to quickly and effortlessly provide low-level details about maintenance actions and component failures without compromising their primary mission.

CBM Data Scoping. As previously mentioned, the amount of data required to field a CBM program is enormous. The problem is compounded by a natural paradox encountered in the fielding of large scale data warehouses [21]. This paradox pits the yet to be discovered benefits of having lots of data in a single location against the resources required to explore these benefits. The antidote for this paradox is to carefully and frequently review data requirements as new capabilities are realized. We recommend regularly examining the granularity requirements of CBM, as well as what specific data elements are actually being used. For example, do we still need to retain the co-pilot's radio select switch position in future MDR data loads?

Standard Cataloging of Abstract Maintenance Objects. Current maintenance information systems are very good at classifying and tracking physical objects and actions – e.g. specific components, maintenance tasks, and failures. However, the tracking and modeling of abstract maintenance concepts – such as what and where components might be installed on a helicopter or what standard maintenance actions might involve these components, is severely underdeveloped. Future research efforts involving aviation maintenance information systems must target this issue, and focus on producing Army-wide acceptable open source standards.

Open-Source Access to All Data. To reap the benefits proposed by the CBM concept, we recommend allowing full access to the widest population and lowest level of source data possible. We also recommend making this data set available to a broad audience of stakeholders. Maximizing the number of people that can access the data, and then engage in professional discourse will ensure we realize the full potential of CBM for the entire Army Aviation Community.

## 6. Conclusion

The Army's transition to a condition based maintenance regimen promises to increase safety and availability while decreasing cost. This approach is highly reliant on advanced prognostic and diagnostic models that will require combining inputs from a plethora of disparate data sources. We believe that the data warehouse design offered in this report offers a good starting point for meeting this need.

## 7. Appendices

Appendix A – Stakeholder Interview Outline

Appendix B – Results of Stakeholder Interviews

Appendix C – Data Dictionary of MDR Parameters

Appendix D – Pareto Analysis of MDR Data

Appendix E – ELAS Schema Information

Appendix F – UniRAM Schema Information

Appendix G – CBMUDM Entity Relationship Diagram

Appendix H – MDR and VEMP Low-Level Stage Physical Design

Appendix I – CBMUDM Physical Design

Appendix J – Suggested Implementation Project Plan

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## APPENDIX A : CBM Data Warehouse Stakeholder Interview Outline

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### STAKEHOLDER NAME/ORGANIZATION/DUTY POSITION/CONTACT INFO

### STAKEHOLDER TYPE

**1. Using one sentence answers, what are the top 3-5 uses or tasks you would have involving information stored in the Data Warehouse. Or, put another way, why would you access the data warehouse? (These will become more detailed use cases later).**

**2. In executing the tasks described in (1), how many users in your organization would use information in the Data Warehouse?**

**3. How would you categorize the interface preference/skills of these users? Please fill in the percentage of users in each category?**

a. Basic Database User – knows how to browse and run pre-built queries and applications. Needs the application developers to construct data views. No SQL programming experience.

b. Power Database User – knows how to used semi-advanced query tools. Can use query design tools and wizards to develop simple views of the data. Little SQL programming experience. 33%

c. Database Designer – knows how to use SQL and other development tools to build custom views of the data.

**4. This next question targets database loading. For the uses described in (1), how often would you access the Data Warehouse? Once a day? Once a Minute? Once a Month?**

**5. This next question targets expected access times. Please indicate, in each row, how much of your total information requirements fit into each category.**

## APPENDIX A : CBM Data Warehouse Stakeholder Interview Outline

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| Access Category | Access Time                  | Percentage of Your Total Information Requirements Residing in this Category? | Timeline of Information in this Category<br><i>- current month's data, last three years, etc.</i> |
|-----------------|------------------------------|--|---|
| Real Time       | I can wait 5 seconds         |  |   |
| Online          | I can wait 30 seconds        |  |   |
| Near Line       | I can wait<br>5 minutes      |  |   |
| Archive         | I can wait can wait 48 hours |  |   |

**6. This next question targets information refresh times. In general, how often do you need your information refreshed/updated? This is not how often you access the information, but when you do access it, how current is it?**

## APPENDIX A : CBM Data Warehouse Stakeholder Interview Outline

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| Refresh Rate | Refresh Interval of Data   | Percentage of Your Total Information Requirements Residing in this Category? | Age of Information in this Category<br><i>- i.e. current month's data, last three years, etc</i> |
|--------------|----------------------------|--|--|
| Real Time    | Current as of Now          |  |  |
| Daily        | Current as of this Morning |  |  |
| Weekly       | Current as of last Monday  |  |  |

**7. What existing software products or tools do you currently use that rely on information that would be contained in the Data Warehouse? What features (views, reports) of these tools do you use the most?**

**8. What types of views and reports do you wish you could produce – but currently cannot - from Army Aviation Maintenance Data?**

**9. What data sources, other than those listed in the introduction, should be included in the Data Warehouse?**

**10. Are there any other stakeholders who we should interview?**

## APPENDIX B – CBM Stakeholder Use Cases

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**Stakeholder :** Walker, Kris

**Stakeholder Type:** Engineer

**Organization :** AMRDEC-RAM

**Phone:** 256-842-9203

**Email:** kris.walker@rdec.redstone.army.mil

**Use-Case ID:** UC-11

**Use-Case Title:** Operational Readiness Analysis

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** weekly

**Primary Actor:** Data Analysis Tool

**Other Actors:** Data warehouse Aviation units in the field

**Pre-Conditions:**

1. 1352 Status Reports must be filled out correctly at unit 2. Status reports must be forwarded to central collection agency. 3. Status reports must be entered into computer. Must break down Non-Mission Capable (Supply) and Non-Mission Capable (Maintenance) time. Also - partially mission capable time.

**Main Success Scenario:**

1. Analyst selects aircraft. 2. Analyst selects time period. 3. Data Analysis Tool goes into the database and pulls the aircraft readiness (1352) information on the selected aircraft during the selected time period. 4. Data Analysis Tool produces the outputs listed in the post-conditions. 5. System returns to step 1

**Variations:**

Complete time period not available - prompt user for another period Partial time period not available - advise user Incomplete/Erroneous readiness data set - advise user

**Post-Conditions:**

(a) Pie chart showing selected aircraft non-mission capable (NMC) time incurred during the selected time window. This pie chart shows total NMC time broken down into primary causes of status: repairs, phase, maintenance work order (MWO), safety of flight (SOF), and schedule. (b) Pie chart showing total status on aircraft broken down by fully mission capable, non-mission capable, and partially mission capable. (c) Bar chart showing, for the non-mission capable time caused by repairs, what components caused these repairs (top 10 offenders - Pareto analysis) (d) Three month "trend" bar chart showing most repaired parts & number of repairs for each incurred in last 3 months (by month)



## APPENDIX B – CBM Stakeholder Use Cases

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### **Data Sources currently used to meet the requirement:**

1352 status reports emailed to team Should get this info from a LOGSA data sources

### **Software currently used to meet this requirement:**

(SAMS?) Excel

### **Additional Comments:**

See power point presentation (RAMEngineerUseCase.ppt)

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**Stakeholder :** Walker, Kris

**Stakeholder Type:** Engineer

**Organization :** AMRDEC-RAM

**Phone:** 256-842-9203

**Email:** kris.walker@rdec.redstone.army.mil

**Use-Case ID:** UC-12

**Use-Case Title:** Recap Analysis

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** periodically

**Primary Actor:** Data Analyst

**Other Actors:** Data warehouse Analysis Application

### **Pre-Conditions:**

1. 2410 Data Current and Complete 2. All part histories known 3. All part location known

### **Main Success Scenario:**

1. Analyst selects 2410 type part (serial number tracked item) using NSN/NINN 2. Analyst selects time period of interest 3. Application mines the data warehouse for the information 4. Application produces the results listed in the post conditions

### **Variations:**

Part not found - Advise user, reenter Time period incorrect - Advise user, reenter Aircraft Specific Filtering - For those parts on multiple platforms, the user may want to filter by aircraft type Unit Specific Filtering - The user might want to restrict analysis to a certain unit Location Specific Filtering - The user may want to restrict analysis to a certain location

### **Post-Conditions:**

## APPENDIX B – CBM Stakeholder Use Cases

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Application produces the following metrics for each part: (a) Total accumulated flight hours the part type was flown on the aircraft (total component life) in time window (b) Number of chargeable removals in time window (c) Mean Time Between Repair of the component in the time window (d) List of details for each removal in the window. Note: These statistics included all parts with the entered NSN/NINN

**Data sources currently used to meet this requirement:**

ELAS AMSAA 2410 Data Quality Deficiency Reports (QDR)

**Software currently used to meet this requirement:**

Excel

**Additional Comments:**

See PowerPoint slide show (RAMEngineerUseCase.ppt) for more details. Excel tools available on request.

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**Stakeholder :** Walker, Kris

**Stakeholder Type:** Engineer

**Organization :** AMRDEC-RAM

**Phone:** 256-842-9203

**Email:** kris.walker@rdc.redstone.army.mil

**Use-Case ID:** UC-13

**Use-Case Title:** Sample Data Collection Analysis

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** periodically

**Primary Actor:** Data Analyst

**Other Actors:** Analysis Tool Data Warehouse

**Pre-Conditions:**

ELAS data entered and correct. Flight Hours entered and correct.

**Main Success Scenario:**

1. Analyst selects time period. 2. Analyst specifies one or more of the following - aircraft type(s), unit(s), location(s). 3. Analysis Tool mines the warehouse for component failures matching the criteria specified in (2). 4. Analysis Tool calculates Mean Time Between Mission Failure, Mean Time Between System Failure. 5. Analysis Tool lists the info in (4) in several groupings - by aircraft type, by location, by unit.

## APPENDIX B – CBM Stakeholder Use Cases

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### **Variations:**

Time period incorrect - advise user and reenter. Time period incomplete - advise user and prompt for reentry

### **Post-Conditions:**

Analysis Tool predicts Mean Time Between Mission Failure, and Mean Time Between System Failure displayed to the analyst and grouped by aircraft type, unit, and location.

### **Data sources:**

### **Software currently used to meet this requirement:**

ELAS AMSAA Flight Hours from 2404-12  
Excel & Access

### **Additional Comments:**

See PowerPoint presentation (RAMEngineerUseCase.ppt)

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**Stakeholder :** Walker, Kris

**Stakeholder Type:** Engineer

**Organization :** AMRDEC-RAM

**Phone:** 256-842-9203

**Email:** kris.walker@rdec.redstone.army.mil

**Use-Case ID:** UC-14

**Use-Case Title:** Vendor Analysis

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** weekly

**Primary Actor:** Data Analyst

**Other Actors:** Analysis Tool. Data warehouse.

### **Pre-Conditions:**

2410 Data complete and comprehensive.

### **Main Success Scenario:**

1. Analyst selects component by NSN/NINN. 2. Analyst specifies one or more filters - unit, location, aircraft, vendors for inclusion/exclusion. 3. Analysis tool mines the database for failures involving the said component. 4. Analysis tool calculates average life estimates, top ten failure modes, and failure distribution as a function of

## APPENDIX B – CBM Stakeholder Use Cases

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time for the component of interest. 5. Analysis tool displays information to analyst. 6. System prompts for restart.

### **Variations:**

### **Post-Conditions:**

For each manufacturer of a particular component tool displays the following  
GROUPED BY COMPONENT VENDOR - (1) total flight hours for component, number of failures, and mean time between component replacement (2) Top ten failure modes for vendor (3) Failure distribution (pdf) for vendor.

### **Data sources currently used to meet this requirement:**

2410 Data Failure Code List

### **Software currently used to meet this requirement:**

Excel, Access, Minitab

### **Additional Comments:**

See power point presentation (RAMEngineerUseCase.ppt) for more information.

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**Stakeholder :** Biddlecombe, Kathy

**Stakeholder Type:** Manager, Analyst

**Organization :** AMRDEC

**Phone:** 256-705-9854

**Email:** kathy.biddlecombe@us.army.mil

**Use-Case ID:** UC-10

**Use-Case Title:** maintenance performance evaluation

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** constantly

**Primary Actor:** Component Analysis Branch or Weapons System Team support

**Other Actors:** IMMC system team leader, PM or individual item manager

### **Pre-Conditions:**

Access to TAMMS-A, LOGSA flying hours, CCSS, CDDDB and NMP or OSMIS data. Process can sort history by source -where was it made, has it been repaired if so when and who by... Are there enough samples of data to be significant? How long does each item last (what is range of confidence) and what was invested to obtain this value?

## APPENDIX B – CBM Stakeholder Use Cases

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### **Main Success Scenario:**

Integrate Condition Based Maintenance information with maintenance, supply and transportation programs. Ability to make coherent support decisions based on data rather than opinion. Make a solid case for reduction of specific configurations, increase modification program application rates, identify items to be phased out of inventory and ride them out of the inventory... Identify impact on inventory and readiness of changes in TBO, finite life. Relate SOF, ASAM or other supply and maintenance actions on out-year requirements and fleet behavior.

### **Variations:**

Run all related NIIN and part number sequences to identify a family related by Work Unit Code (WUC) to evaluate differences between configurations.

### **Post-Conditions:**

Change in supply study and stratification of funding/requirements. Potential change in maintenance and transport processes. Re-alignment of funds.

### **Data sources currently used to meet this requirement:**

Component history is compared to cost to provide a performance factor = hours of use obtained for each dollar invested. Primary source of data may be cost of new procurement or cost of repair. Repair cost stems from the facility and level of repair. Depot costs are normally for depot work. Unit cost can be for unit repair or a National Maintenance Program cost for a repair returning the item to like new condition... Granularity beyond Std OSMISS output supports evaluation of the repair stations.

### **Software currently used to meet this requirement:**

At-LAST model, SAS, Oracle

### **Additional Comments:**

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**Stakeholder :** Biddlecombe, Kathy

**Stakeholder Type:** Manager, Analyst

**Organization :** AMRDEC

**Phone:** 256-705-9854

**Email:** kathy.biddlecombe@us.army.mil

**Use-Case ID:** UC-20

**Use-Case Title:** Maintenance planning and scheduling

**Use-Case Priority:** will\_need\_eventually

**Frequency of Use:** daily

**Primary Actor:** Maintenance Planner

## APPENDIX B – CBM Stakeholder Use Cases

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**Other Actors:** Decision Support Tool (DST)

**Pre-Conditions:**

Complete picture of OPTEMPO, supply assets

**Main Success Scenario:**

1. Planner selects an appropriate level of analysis or scope. This ranges from the individual part all the way up to DOD level 2. The DST produces the post-conditions output for the selected level.

**Variations:**

**Post-Conditions:**

Analytical Tool answers the following questions at the desired level: (1) What do we need? (2) How many do we need? (3) Where do we need them? (4) When do we need them? (5) How much does it cost? Where cost is in terms of one or more of the following: Cash flow, cycle time, parts, consumables, transportation assets, readiness, lives, safety

**Data sources currently used to meet this requirement:**

OSMISS, CCSS, QDRS, CDDB

**Additional Comments:**

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**Stakeholder :** Kellogg, Gary

**Stakeholder Type:** Manager

**Organization :** AED Propulsion Division

**Phone:** 256-319-5201

**Email:** gary.kellogg@rdec.redstone.army.mil

**Use-Case ID:** UC-27

**Use-Case Title:** Maintenance policy effect on readiness

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** daily

**Primary Actor:** Analyst

**Other Actors:** Data Analysis Tool

## APPENDIX B – CBM Stakeholder Use Cases

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### **Pre-Conditions:**

Readiness levels known for engines. Complete and correct failure information (type, cause, etc) is known. Maintenance policy (schedule, regime, etc) known.

### **Main Success Scenario:**

Analyst selects component. Tool mines the database for failure information and statistics. Tool also mines corresponding maintenance activity impact the selected component. Tool provides a composite view of the component's failure history vis-à-vis maintenance policy. Tool will also provide limited modeling and simulation capability to study effects of an altered maintenance policy.

### **Variations:**

Analyst can limit analysis to certain subsets of population - engine type, location, configuration, unit, etc. Analyst can also filter for certain periods of time.

### **Post-Conditions:**

Analyst can correlate and study the impact of maintenance policy on readiness. For example, if a TBO is extended, how will it impact the readiness or performance of the component?

### **Data sources currently used to meet this requirement:**

OSMIS, 2410, ELAS

### **Additional Comments:**

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**Stakeholder :** Martin, Ed

**Stakeholder Type:** Engineer, Manager

**Organization :** AED Structures & Materials

**Phone:** 256-705-9674

**Email:** edwinmartin2@us.army.mil

**Use-Case ID:** UC-19

**Use-Case Title:** Reliability analysis on waivers

**Use-Case Priority:** will\_need\_eventually

**Frequency of Use:** daily

**Primary Actor:** Analyst

**Other Actors:** Analytical Tool, Maintenance database, Maintenance decision maker

## APPENDIX B – CBM Stakeholder Use Cases

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### **Pre-Conditions:**

Aircraft component maintenance history complete, known, correct. Component usage history known, correct, complete. Component failure record complete, known, correct.

### **Main Success Scenario:**

1. Maintenance decision maker expresses interest in altering maintenance procedures - i.e. extending mandatory replacement times, inspection intervals, etc. 2. Analyst selects component. 3. Analytical tool displays current maintenance information (regime), usage data, and failure data. 4. Tool facilitates (via simulation, modeling, etc) study of how waiver would alter (3) above.

### **Variations:**

### **Post-Conditions:**

Analyst can inform the decision maker how the waiver would impact component failure (implications in the area of cost, reliability, safety, etc)

### **Data sources currently used to meet this requirement:**

VMEP, MDR, ELAS, Maintenance records

### **Additional Comments:**

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**Stakeholder :** Martin, Ed

**Stakeholder Type:** Engineer, Manager

**Organization :** AED Structures & Materials

**Phone:** 256-705-9674

**Email:** edwinmartin2@us.army.mil

**Use-Case ID:** UC-15

**Use-Case Title:** Predict time or conditions for failure

**Use-Case Priority:** will\_need\_eventually

**Frequency of Use:** constantly

### **Primary Actor:**

Analyst

**Other Actors:** Analytical Tools Units in the field Aircraft

### **Pre-Conditions:**

Aircraft failures in the field are known. Conditions the aircraft where flown in are known.



## APPENDIX B – CBM Stakeholder Use Cases

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### **Main Success Scenario:**

1. Analyst enters aircraft type or tail number. 2. Analytical tool mines the database for aircraft history, conditions flown, reliability models, and past failure histories 3. Tool issues a prediction to the analyst as to when the aircraft, or fleet of aircraft will fail.

### **Variations:**

The analyst may also be interested in individually component failure.

### **Post-Conditions:**

Analyst receives either an estimated time, or set of conditions when the aircraft will experience failure.

### **Data sources currently used to meet this requirement:**

Qualification Data, 2410, ELAS

### **Software currently used to meet this requirement:**

Excel, INCODE, VDRI

### **Additional Comments:**

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**Stakeholder :** Martin, Ed

**Stakeholder Type:** Engineer, Manager

**Organization :** AED Structures & Materials

**Phone:** 256-705-9674

**Email:** edwinmartin2@us.army.mil

**Use-Case ID:** UC-16

**Use-Case Title:** Link usage to failure

**Use-Case Priority:** will\_need\_eventually

**Frequency of Use:** daily

### **Primary Actor:**

Analyst

**Other Actors:** Field aircraft. Analytical tool.

### **Pre-Conditions:**

Individual component failures from the aircraft fleet are known and well documented. Failure causes are well known and correct. Conditions component experienced over its lifetime are well known (flight conditions, environmental forces, rebuilds, etc).

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### **Main Success Scenario:**

1. Analyst selects component. 2. Analytical tool mines database for failure information about the component, usage history (flight conditions, loads, maintenance records, etc) 3. Tool provides a cross-cutting view to the analyst consisting of failure type/mode/details and complete usage history. Data in relatively raw form so analyst can run separate tools.

### **Variations:**

The tool may also incorporate built in analytical tools (aggregation of population data, filtering, etc.) as a pre-processing step for the analyst.

### **Post-Conditions:**

Tool provides a cross-cutting view to the analyst consisting of failure type/mode/details and complete usage history. Data in relatively raw form so analyst can run separate tools.

### **Data sources currently used to meet this requirement:**

VMEP, 2410, OEM, ELAS, MDR

### **Software currently used to meet this requirement:**

INCODE, Excel, VRMI

### **Additional Comments:**

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**Stakeholder :** Martin, Ed

**Stakeholder Type:** Engineer, Manager

**Organization :** AED Structures & Materials

**Phone:** 256-705-9674

**Email:** edwinmartin2@us.army.mil

**Use-Case ID:** UC-17

**Use-Case Title:** Examine mitigation treatments on component failure

**Use-Case Priority:** will\_need\_eventually

**Frequency of Use:** daily

**Primary Actor:** Analyst

**Other Actors:** Aircraft data from field. OEM data.

## APPENDIX B – CBM Stakeholder Use Cases

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### **Pre-Conditions:**

Individual component failures from the aircraft fleet are known and well documented. Failure causes are well known and correct. Conditions component experienced over its lifetime are well known (flight conditions, environmental forces, rebuilds, etc). Maintenance procedures (TBO times, inspection intervals, preventative maintenance schedules, etc), manufacturing processes, and other treatments are well known.

### **Main Success Scenario:**

1. Analyst selects component and one of several screening criteria (see variations below). 2. Analytical tool mines database for failure information about the component, usage history (flight conditions, loads, maintenance records, etc) 3. Tool provides a comprehensive view of the component consisting of failure information usage, and maintenance treatment information.

### **Variations:**

Analyst may select to focus on specific manufacturers, or other component subset (by unit, age, location, etc).

### **Post-Conditions:**

Tool provides a cross-cutting view to the analyst consisting of failure type/mode/details and complete usage history. View also includes complete discussion of maintenance treatments - OEM information, manufacturer info, inspection intervals, TBOs, preventative maintenance schedule, etc. Data in relatively raw form so analyst can run separate tools.

### **Data sources currently used to meet this requirement:**

VMPE, ELAS, MDR, 2410

### **Software currently used to meet this requirement:**

Excel, INCODE

### **Additional Comments:**

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**Stakeholder :** Martin, Ed

**Stakeholder Type:** Engineer, Manager

**Organization :** AED Structures & Materials

**Phone:** 256-705-9674

**Email:** edwinmartin2@us.army.mil

**Use-Case ID:** UC-18

**Use-Case Title:** Compare and manipulate time-dependent data

**Use-Case Priority:** must\_have\_now

## APPENDIX B – CBM Stakeholder Use Cases

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**Frequency of Use:** daily

**Primary Actor:** Analyst

**Other Actors:** Field data from aircraft fleet

**Pre-Conditions:**

Aircraft DSC information known and complete.

**Main Success Scenario:**

1. Analyst selects one or more time dependent data sets (VMEP, MDR, HUMS, etc)  
2. Within each data set, analyst selects certain components - i.e. frequency ranges, attitude, flight regimes. 3. Analyst selects certain time interval. 4. Tool produces a composite view of the selected data sources on common synchronized timeline.

**Variations:**

Analyst selects multiple components. Analyst specifies time scale. Analyst selects type of composite view - bar chart, plot, side by side plots, multi-dimensional plots, etc..

**Post-Conditions:**

Tool provides a composite view - chart, plot, etc - which shows two or more time dependent variable sets on the same view, and synched according to common timeline.

**Data sources currently used to meet this requirement:**

VMEP, MDR

**Software currently used to meet this requirement:**

INCODE

**Additional Comments:**

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**Stakeholder :** Kochoff-Platt, Michele

**Stakeholder Type:** Manager

**Organization :** PM Apache

**Phone:** 256-313-4037

**Email:** MicheleKochoff.Platt@PeoAvn.Redstone.Army.Mil

**Use-Case ID:** UC-21

**Use-Case Title:** PM Attack Metric Calculation

**Use-Case Priority:** will\_need\_eventually

**Frequency of Use:** daily

## APPENDIX B – CBM Stakeholder Use Cases

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**Primary Actor:** Analyst

**Other Actors:** Analytical tool, field units, decision makers

**Pre-Conditions:**

Data sources complete, correct, and accessible.

**Main Success Scenario:**

1. Analyst selects entire fleet or subset of fleet (see variations). 2. Analyst selects one or more metrics for evaluation. 3. Analyst selects time period for evaluation. 4. Analytical tool calculates metrics matching user input

**Variations:**

Analyst can restrict aircraft to a certain sub-population: unit, tail-number series, configuration, geographical location

**Post-Conditions:**

Analytical tool produces metrics in a variety of different forms - list, table, etc.

**Data sources currently used to meet this requirement:**

IMMC, OSMIS, 7-101 at FTCKY, TACTS 2410 and -16, ELAS, IMPS, 1352, ULLSA

**Software currently used to meet this requirement:**

Excel

**Additional Comments:**

See "Fleet Metric Dictionary" (Excel file) maintained by M.Platt. This list shows all pertinent metrics of interest.

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**Stakeholder :** Kochoff-Platt, Michele

**Stakeholder Type:** Manager

**Organization :** PM Apache

**Phone:** 256-313-4037

**Email:** MicheleKochoff.Platt@PeoAvn.Redstone.Army.Mil

**Use-Case ID:** UC-22

**Use-Case Title:** Parts and configuration tracking

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** daily

**Primary Actor:** Analyst

## APPENDIX B – CBM Stakeholder Use Cases

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**Other Actors:** Analytical tool, field units

**Pre-Conditions:**

Data sources complete and correct

**Main Success Scenario:**

1. Analyst selects component of interest. 2. Tool mines the database to determine component locations and configurations. 3. System displays information to analyst.

**Variations:**

Analyst restrict use-case to various subsets of the component population - vendor, configuration, location, unit, etc.

**Post-Conditions:**

Analytical tool displays location of selected component in a variety of various groupings: location, unit, configuration, manufacturer, etc.

**Data sources currently used to meet this requirement:**

2410, ELAS, IMPS

**Additional Comments:**

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**Stakeholder :** Berry, John

**Stakeholder Type:** Engineer

**Organization :** AED - Rotor, dynamics, aero

**Phone:** 256-705-9602

**Email:** john.berry@us.army.mil

**Use-Case ID:** UC-23

**Use-Case Title:** Vibration vis-à-vis maintenance action

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** daily

**Primary Actor:** Analyst

**Other Actors:** Analytical tool, field data

**Pre-Conditions:**

Complete VMEP dataset. Complete maintenance action data set.

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### **Main Success Scenario:**

1. Analyst selects a VMEP sensor 2. Analytical tool mines the database for vibration levels and any maintenance activity near the sensor 3. Tool displays composite view to user showing vibration data (history) and maintenance history.

### **Variations:**

### **Post-Conditions:**

User can monitor vibration data and how maintenance actions might have effected it. For example, was a component replaced? If so, what happened to the vibration level??

### **Data sources currently used to meet this requirement:**

VMEP, ELAS, 2410

### **Additional Comments:**

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**Stakeholder :** Carter, Jim

**Stakeholder Type:** Manager, Engineer

**Organization :** IMMC

**Phone:**

**Email:** James.W.Carter@us.army.mil

**Use-Case ID:** UC-24

**Use-Case Title:** Failure statistics

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** constantly

**Primary Actor:** Analyst

**Other Actors:**

Analytical tool, field units, decision makers

### **Pre-Conditions:**

Failure dataset complete, correct, accessible. Conditions dataset complete, correct, accessible. Analyst or decision makers interested in component failure information.

### **Main Success Scenario:**

1. Analyst selects component. 2. Analytical tool mines database for failure matching this component, and conditions leading to the failure. 3. Analytical tool displays information (distributions, stats) to analyst

## APPENDIX B – CBM Stakeholder Use Cases

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### **Variations:**

Analyst can restrict output to one of several subsets of entire component population - by unit, location, vendor, etc.

### **Post-Conditions:**

System displays the following - mean time between unscheduled repairs, failure distribution (based on time and/or conditions), what where the causes of failure (based on tear-down analysis).

### **Data sources currently used to meet this requirement:**

2410, ELAS, MDR, OSMIS

### **Additional Comments:**

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**Stakeholder :** Fealy, John

**Stakeholder Type:** Analyst

**Organization :** Clockwork Solutions

**Phone:** 512-338-1945 x104

**Email:** john.fealy@clockwork-solutions.com

**Use-Case ID:** UC-25

**Use-Case Title:** State of the fleet

**Use-Case Priority:** must\_have\_now

**Frequency of Use:** constantly

### **Primary Actor:**

Analyst

### **Other Actors:**

Analysis tool, field units

### **Pre-Conditions:**

Location of all aircraft, their configuration, and component location is known. Status of aircraft is known. Age of components known. OPTEMPO of unit known. Supply activities (Depot, transportation, etc) and expected performance known.

### **Main Success Scenario:**

1. Analyst selects a component (or aircraft). 2 Analyst applies one of several filters (see variations) 3. Analysis tool mines database for component locations, status, OPTEMPO, and life information. 4. Analysis tool displays composite information about status, expected repair times, expected readiness.



## Appendix C - MDR Data Dictionary

### **Catalog of available MDR parameters (data elements)**

**Reference: Longbow Integrated Maintenance Support System Ground Analysis Software (Version 8) User's Guide dated 17 March 2004**

The Maintenance Data Recorder (MDR) is a crash survivable, on-aircraft data storage device used on the Apache Longbow (AH-64D). The MDR interfaces with a MIL-STD-1553B data bus as a Remote Terminal (RT) Line Replaceable Unit (LRU) and provides a means of recording and downloading maintenance and safety data while installed on the aircraft. MDR recorded data is high-speed downloaded to the Soldier's Portable On-system Repair Tool (SPORT) via a 1553 interface, where Ground Analysis Software (GAS), for example, resolves multiple fault ambiguity and launches the Interactive Electronic Technical Manual (IETM). The MDR has sufficient storage capability to record multiple flights of safety and maintenance data.

The MDR records data at a rate of 6.5 hz (6.5 times a second).

The information on the following pages details the Fault and Excedance parameter and safety download parameters.

## Appendix C - MDR Data Dictionary

Fault & Exceedance Aircraft Operating Mode Parameter List

| Description                                 | Minimum Value | Full Scale Value | Units and Operating State                             |
|---|---------------|------------------|---|
| SP SQUAT SW                                 | 0             | 1                | 0=In Air 1=On Ground                                  |
| SP Operating Mode                           | 0             | 1                | 0=SP1 1=SP2   |
| System Processor Sel Switch                 | 0             | 3                | 0=Secondary 1=Spare 2=Auto 3=Primary                  |
| DP1 Operating Mode                          | 0             | 7                | 0=No Operation 1=Single 2=Normal Sec 3=Normal Primary |
| DP2 Operating Mode                          | 0             | 7                | 0=No Operation 1=Single 2=Normal Sec 3=Normal Primary |
| WP1 Operating Mode                          | 0             | 1                | 0=Normal Primary 1=Normal Secondary                   |
| WP2 Operating Mode                          | 0             | 1                | 0=Normal Primary 1=Normal Secondary                   |
| Generator 1 Inhibit                         | 0             | 1                | 0=No Inhibit 1=Inhibit                                |
| Generator 2 Inhibit                         | 0             | 1                | 0=No Inhibit 1=Inhibit                                |
| Weapons Triggers                            | 0             | 1                | 0=No Trigger 1=WPN Trigger                            |
| GPU Trip Status                             | 0             | 3                | 0=Spare 1=Not Tripped 2=Tripped 3=Spare               |
| Generator 1 Trip Status                     | 0             | 3                | 0=Spare 1=Not Tripped 2=Tripped 3=Spare               |
| Generator 2 Trip Status                     | 0             | 3                | 0=Spare 1=Not Tripped 2=Tripped 3=Spare               |
| AC Elec Bus #1 Phase A Voltage <sup>1</sup> | 0             | 165              | Volts AC  |
| AC Elec Bus #1 Phase B Voltage <sup>1</sup> | 0             | 165              | Volts AC  |
| AC Elec Bus #1 Phase C Voltage <sup>1</sup> | 0             | 165              | Volts AC  |
| Battery Voltage <sup>1</sup>                | 0             | 41               | Volts DC  |
| Battery Elec Bus #1 Voltage <sup>1</sup>    | 0             | 41               | Volts DC  |
| DC Elec Bus #1 Voltage <sup>1</sup>         | 0             | 41               | Volts DC  |
| AC Elec Bus #2 Phase A Voltage <sup>1</sup> | 0             | 165              | Volts AC  |
| AC Elec Bus #2 Phase B Voltage <sup>1</sup> | 0             | 165              | Volts AC  |
| AC Elec Bus #2 Phase C Voltage <sup>1</sup> | 0             | 165              | Volts AC  |
| Battery Elec Bus #2 Voltage <sup>1</sup>    | 0             | 41               | Volts DC  |
| DC Elec Bus #2 Voltage <sup>1</sup>         | 0             | 41               | Volts DC  |
| BUCS Mode                                   | 0             | 1                | 0=Off 1=On  |
| Pilot Master Arm                            | 0             | 1                | 0=Safe 1=Arm  |
| CPG Master Arm                              | 0             | 1                | 0=Safe 1=Arm  |
| Boost Pump On                               | 0             | 1                | 0=Off 1=ON  |
| Lateral Airspeed                            | -100          | 100              | Knots   |
| Longitudinal Airspeed                       | -256          | 256              | Knots   |
| Long Accel (Ax)                             | -128          | 128              | meters/second/second                                  |
| Lateral Accel (Ay)                          | -128          | 128              | meters/second/second                                  |
| Vertical Accel (Az)                         | -128          | 128              | meters/second/second                                  |
| Pitch Angle                                 | -1            | 1                | Semicircle  |
| Roll Angle                                  | -1            | 1                | Semicircle  |
| Side Slip Angle                             | -180          | 180              | Degrees   |
| Roll Rate                                   | -4            | 4                | Semicircle  |
| Pitch Rate                                  | -4            | 4                | Semicircle  |
| Yaw Rate                                    | -4            | 4                | Semicircle  |
| Primary Hydraulic Pressure                  | 0             | 7299.2701        | PSI Gauge   |

<sup>1</sup> Electrical Bus Voltages, CPG Controls Positions and IAFS Commands are only available for aircraft with Version 6 or later SP software installed in them.

# Appendix C - MDR Data Dictionary

| Description                     | Minimum Value | Full Scale Value | Units and Operating State  |
|---------------------------------|---------------|------------------|----------------------------|
| Utility Hydraulic Pressure      | 0             | 7299.2701        | PSI Gauge                  |
| PLT/CPG Emer Hyd Sel            | 0             | 1                | 0=Not Active 1=Active      |
| Engine #1 TGT                   | 0             | 1000             | Degrees Celsius            |
| Engine #1 Torque                | 0             | 282.0568         | Percent                    |
| Engine #1 NG                    | 0             | 130              | Percent                    |
| Engine #1 NP                    | 0             | 130              | Percent                    |
| Engine #2 TGT                   | 0             | 1000             | Degrees Celsius            |
| Engine #2 Torque                | 0             | 282.0568         | Percent                    |
| Engine #2 NG                    | 0             | 130              | Percent                    |
| Engine #2 NP                    | 0             | 130              | Percent                    |
| Engine #1 Oil Pressure          | 0             | 2047             | Pounds/Square Inch         |
| Engine #2 Oil Pressure          | 0             | 2047             | Pounds/Square Inch         |
| Engine #1 NGRBX Oil Press       | 0             | 100              | Pounds/Square Inch Gauge   |
| Engine #1 NGRBX Oil Temp        | -25           | 300              | Degrees Fahrenheit         |
| Engine #2 NGRBX Oil Press       | 0             | 100              | Pounds/Square Inch Gauge   |
| Engine #2 NGRBX Oil Temp        | -25           | 300              | Degrees Fahrenheit         |
| LH Main Xmsn Oil Temp           | -25           | 300              | Degrees Fahrenheit         |
| LH Main Xmsn Oil Pressure       | 0             | 100              | Pounds/Square Inch Gauge   |
| RH Main Xmsn Oil Temp           | -25           | 300              | Degrees Fahrenheit         |
| RH Main Xmsn Oil Pressure       | 0             | 100              | Pounds/Square Inch Gauge   |
| CPG #1 Throttle Off             | 0             | 1                | 0=On 1=Off                 |
| CPG #1 Throttle Lockout         | 0             | 1                | 0=On 1=Off                 |
| CPG #1 Throttle Idle            | 0             | 1                | 0=On 1=Off                 |
| CPG #1 Throttle Fly             | 0             | 1                | 0=On 1=Off                 |
| CPG #2 Throttle Off             | 0             | 1                | 0=On 1=Off                 |
| CPG #2 Throttle Lockout         | 0             | 1                | 0=On 1=Off                 |
| CPG #2 Throttle Idle            | 0             | 1                | 0=On 1=Off                 |
| CPG #2 Throttle Fly             | 0             | 1                | 0=On 1=Off                 |
| Eng 1 Bleed Air PRSOV Open      | 0             | 1                | 0=Closed 1=Open            |
| Eng 2 Bleed Air PRSOV Open      | 0             | 1                | 0=Closed 1=Open            |
| Fuel Crossfeed Mode             | 0             | 3                | 0=Fail 1=Off 2=On 3=Fail   |
| Fuel Crossfeed Select           | 0             | 3                | 0=Fail 1=Off 2=On 3=Fail   |
| IAFS Pump Command <sup>1</sup>  | 0             | 1                | 0=On 1=Off                 |
| IAFS Transfer Mode <sup>1</sup> | 0             | 1                | 0=Off 1=On                 |
| IAFS DC Command <sup>1</sup>    | 0             | 4                | 0=Spare 1=Off 2=On 3=Spare |
| IAFS Pump Status <sup>1</sup>   | 0             | 4                | 0=Spare 1=Off 2=On 3=Spare |
| IAFS DC Status <sup>1</sup>     | 0             | 4                | 0=Spare 1=Off 2=On 3=Spare |
| Man Fuel Xfer Aft Sel           | 0             | 3                | 0=Spare 1=Off 2=On 3=Spare |
| Man Fuel Xfer Fwd Sel           | 0             | 3                | 0=Spare 1=Off 2=On 3=Spare |
| Left Wing Fuel SOV Open         | 0             | 1                | 0=Not Open 1=Open          |
| Left Wing Fuel SOV Closed       | 0             | 1                | 0=Not Closed 1=Closed      |
| Right Wing Fuel SOV Open        | 0             | 1                | 0=Not Open 1=Open          |
| Right Wing Fuel SOV Closed      | 0             | 1                | 0=Not Closed 1=Closed      |
| Aft Fuel Cell SOV Open          | 0             | 1                | 0=Closed 1=Open            |
| Forward Fuel Cell SOV Open      | 0             | 1                | 0=Closed 1=Open            |

# Appendix C - MDR Data Dictionary

| Description                    | Minimum Value | Full Scale Value | Units and Operating State |
|--------------------------------|---------------|------------------|---------------------------|
| APU Fuel SOV Open              | 0             | 1                | 0=Not Open 1=Open         |
| APU Fuel SOV Closed            | 0             | 1                | 0=Not Closed 1=Closed     |
| Engine #1 Fire Ext Arm         | 0             | 1                | 0=Off 1=On                |
| Engine #2 Fire Ext Arm         | 0             | 1                | 0=Off 1=On                |
| APU Fire Ext Arm               | 0             | 1                | 0=Off 1=On                |
| Fire Ext #1 DSCH               | 0             | 1                | 0=Off 1=On                |
| Fire Ext #2 DSCH               | 0             | 1                | 0=Off 1=On                |
| PLT BUCS On CLTV               | 0             | 1                | 0=Off 1=On                |
| PLT BUCS On YAW                | 0             | 1                | 0=Off 1=On                |
| PLT BUCS On ROLL               | 0             | 1                | 0=Off 1=On                |
| PLT BUCS On PITCH              | 0             | 1                | 0=Off 1=On                |
| CPG BUCS On CLTV               | 0             | 1                | 0=Off 1=On                |
| CPG BUCS On YAW                | 0             | 1                | 0=Off 1=On                |
| CPG BUCS On ROLL               | 0             | 1                | 0=Off 1=On                |
| CPG BUCS On PITCH              | 0             | 1                | 0=Off 1=On                |
| PLT Collective ARDD            | 0             | 1                | 0=Coupled 1=Decoupled     |
| PLT Direct ARDD                | 0             | 1                | 0=Coupled 1=Decoupled     |
| PLT Lateral ARDD               | 0             | 1                | 0=Coupled 1=Decoupled     |
| PLT Long ARDD                  | 0             | 1                | 0=Coupled 1=Decoupled     |
| CPG Collective ARDD            | 0             | 1                | 0=Coupled 1=Decoupled     |
| CPG Direct ARDD                | 0             | 1                | 0=Coupled 1=Decoupled     |
| CPG Lateral ARDD               | 0             | 1                | 0=Coupled 1=Decoupled     |
| Pilot Pitch Stk Pos            | -8.6243       | 8.6243           | Inches                    |
| Pilot Roll Stk Pos             | -7.2287       | 7.2287           | Inches                    |
| Pilot Cltv Stk Pos             | -9.5505       | 9.5505           | Inches                    |
| Pilot Yaw Pedal Pos            | -5.3953       | 5.3953           | Inches                    |
| CPG Pitch Stk Pos <sup>1</sup> | -8.6243       | 8.6243           | Inches                    |
| CPG Roll Stk Pos <sup>1</sup>  | -7.2288       | 7.2288           | Inches                    |
| CPG Cltv Stk Pos <sup>1</sup>  | -9.5505       | 9.5505           | Inches                    |
| CPG Yaw Pedal Pos <sup>1</sup> | -5.5258       | 5.5258           | Inches                    |
| Pitch RAM A Actuator           | -3.2013       | 3.2013           | Inches                    |
| Roll RAM A Actuator            | -3.2013       | 3.2013           | Inches                    |
| YAW RAM A Actuator             | -3.2013       | 3.2013           | Inches                    |
| Cltv RAM A Actuator            | -3.2013       | 3.2013           | Inches                    |
| Hover Hold Mode                | 0             | 1                | 0=Off 1=On                |
| Altitude Hold                  | 0             | 1                | 0=Off 1=On                |
| Radar Altitude Valid           | 0             | 1                | 0=Invalid 1=Valid         |
| Altitude Hold                  | 0             | 1                | 0=Off 1=On                |
| ASE Collective                 | 0             | 1                | 0=Off 1=On                |
| ASE Yaw                        | 0             | 1                | 0=Off 1=On                |
| ASE Roll                       | 0             | 1                | 0=Off 1=On                |
| ASE Pitch                      | 0             | 1                | 0=Off 1=On                |
| ASE Trim                       | 0             | 1                | 0=Off 1=On                |
| ASE NOE/Approach               | 0             | 1                | 0=Off 1=On                |
| Gun Actioned                   | 0             | 1                | 0=Not Actioned 1=Actioned |

# Appendix C - MDR Data Dictionary

| Description                       | Minimum Value | Full Scale Value | Units and Operating State           |
|-----------------------------------|---------------|------------------|-------------------------------------|
| TCB Fire Inhibit                  | 0             | 1                | 0=Inhibited 1=Not Inhibited         |
| Battleshort Enabled               | 0             | 3                | 0=No Change 1=Open 2=Closed 3=Spare |
| Pylon 1 Rocket Arm Pwr Stat       | 0             | 1                | 0=Not Present 1=Present             |
| Pylon 1 PAC Position              | -20           | 20               | Degrees                             |
| Pylon 2 Rocket Arm Pwr Stat       | 0             | 1                | 0=Not Present 1=Present             |
| Pylon 2 PAC Position              | -20           | 20               | Degrees                             |
| Pylon 3 Rocket Arm Pwr Stat       | 0             | 1                | 0=Not Present 1=Present             |
| Pylon 3 PAC Position              | -20           | 20               | Degrees                             |
| Pylon 4 Rocket Arm Pwr Stat       | 0             | 1                | 0=Not Present 1=Present             |
| Pylon 4 PAC Position              | -20           | 20               | Degrees                             |
| ECS 1 CPG Evap. Return Temp.      | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 Pilot Evap. Return Temp.    | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 CPG Evap. Supply Temp.      | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 Pilot Evap. Supply Temp.    | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 Compressor Phase A Current  | -327680       | 327680           | Milliamps                           |
| ECS 1 Compressor Phase B Current  | -327680       | 327680           | Milliamps                           |
| ECS 1 Compressor Phase C Current  | -327680       | 327680           | Milliamps                           |
| ECS 1 Compressor Suction Press.   | -3276.8       | 3276.8           | Pounds/Square Inch                  |
| ECS 1 Compressor Discharge Press. | -3276.8       | 3276.8           | Pounds/Square Inch                  |
| ECS 1 RH EFAB Evap. Return Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 LH EFAB Evap. Return Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 Condenser Fan1 Phase A Amps | 0             | 65535            | Milliamps                           |
| ECS 1 Condenser Fan2 Phase A Amps | 0             | 65535            | Milliamps                           |
| ECS 1 APS Fan Phase A Amps        | 0             | 65535            | Milliamps                           |
| ECS 1 Compressor Suction Temp.    | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 Compressor Discharge Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 RH EFAB Evap. Supply Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 LH EFAB Evap. Supply Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 Condenser Inlet Temp.       | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 1 Condenser Discharge Temp.   | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS1 CPG Temp. Control Valve Pos. | 0             | 65535            | Percent                             |
| ECS 1 Compressor Motor Temp.      | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 2 Pilot Evap. Return Temp.    | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 2 CPG Evap. Return Temp.      | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 2 Pilot Evap. Supply Temp.    | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 2 CPG Evap. Supply Temp.      | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 2 Compressor Phase A Current  | -327680       | 327680           | Milliamps                           |
| ECS 2 Compressor Phase B Current  | -327680       | 327680           | Milliamps                           |
| ECS 2 Compressor Phase C Current  | -327680       | 327680           | Milliamps                           |
| ECS 2 Compressor Suction Press.   | -3276.8       | 3276.8           | Pounds/Square Inch                  |
| ECS 2 Compressor Discharge Press. | -3276.8       | 3276.8           | Pounds/Square Inch                  |
| ECS 2 RH EFAB Evap. Return Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 2 LH EFAB Evap. Return Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                  |
| ECS 2 Condenser Fan1 Phase A Amps | 0             | 65535            | Milliamps                           |
| ECS 2 Condenser Fan2 Phase A Amps | 0             | 65535            | Milliamps                           |

# Appendix C - MDR Data Dictionary

| Description                       | Minimum Value | Full Scale Value | Units and Operating State              |
|-----------------------------------|---------------|------------------|--|
| ECS 2 APS Fan Phase A Amps        | 0             | 65535            | Milliamps                              |
| ECS 2 Compressor Suction Temp.    | -3276.8       | 3276.8           | Degrees Fahrenheit                     |
| ECS 2 Compressor Discharge Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                     |
| ECS 2 RH EFAB Evap. Supply Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                     |
| ECS 2 LH EFAB Evap. Supply Temp.  | -3276.8       | 3276.8           | Degrees Fahrenheit                     |
| ECS 2 Condensor Inlet Temp.       | -3276.8       | 3276.8           | Degrees Fahrenheit                     |
| ECS 2 Condenser Discharge Temp.   | -3276.8       | 3276.8           | Degrees Fahrenheit                     |
| ECS2 PLT Temp. Control Valve Pos. | 0             | 65535            | Percent                                |
| ECS 2 Compressor Motor Temp.      | -3276.8       | 3276.8           | Degrees Fahrenheit                     |
| VCR Power Control                 | 0             | 1                | 0=Off 1=On                             |
| Pilot Guard Selected              | 0             | 1                | 0=Selected 1=Not Selected              |
| CPG Guard Selected                | 0             | 1                | 0=Selected 1=Not Selected              |
| Guard Receiver Mode               | 0             | 1                | 0=Off 1=On                             |
| IFF Emergency Selected            | 0             | 3                | 0=No Change 1=Disable 2=Enable 3=Spare |
| CPG IFF Emergency Selected        | 0             | 1                | 0=Selected 1=Not Selected              |
| Pilot IFF Emergency Selected      | 0             | 1                | 0=Selected 1=Not Selected              |
| CPG Zeroize Selected              | 0             | 1                | 0=Selected 1=Not Selected              |
| Pilot Zeroize Selected            | 0             | 1                | 0=Selected 1=Not Selected              |
| FCR Zeroized                      | 0             | 1                | 0=Not Zeroized 1=Zeroized              |
| TADS Laser Arm                    | 0             | 1                | 0=Safe 1=Arm                           |
| Comm Zeroized                     | 0             | 3                | 0=Spare 1=Off 2=Zero 3=Spare           |
| Left Squat Switch                 | 0             | 1                | 0=Ground 1=Airborne                    |
| WP1 SQUAT SW                      | 0             | 1                | 0=In Air 1=On Ground                   |
| WP2 SQUAT SW                      | 0             | 1                | 0=In Air 1=On Ground                   |
| DP1 SQUAT SW                      | 0             | 1                | 0=In Air 1=On Ground                   |
| DP2 SQUAT SW                      | 0             | 1                | 0=In Air 1=On Ground                   |
| CIU Squat Switch                  | 0             | 1                | 0=Off 1=On                             |
| Engine #1 Anti-Ice Valve Stat     | 0             | 3                | 0=Spare 1=Off/Open 2=On/Clsd 3=Spare   |
| Engine #1 Anti-Ice Heater Stat    | 0             | 3                | 0=Spare 1=Off 2=On 3=Spare             |
| Engine #2 Anti-Ice Valve Stat     | 0             | 3                | 0=Spare 1=Off/Open 2=On/Clsd 3=Spare   |
| Engine #2 Anti-Ice Heater Stat    | 0             | 3                | 0=Spare 1=Off 2=On 3=Spare             |

# Appendix C - MDR Data Dictionary

Safety Data Parameters

| Type | Bytes | Description                     | MINVAL                                  | MAXVAL         | Resolution    | Data Type | Threshold | Units   |
|------|-------|---------------------------------|---|----------------|---------------|-----------|-----------|---------|
| 100  | 2     | Combination                     |   |                |               |           |           |         |
|      | 00-11 | Engine #1 TGT                   | 0                                       | 1000           | 4.8828125E-1  | UNSIGNED  | 10        | DEG C   |
|      | 12    | Engine #1 Throttle Fly          | 0=ON                                    | 1=OFF          |               | DISCRETE  | Change    |         |
|      | 13    | Engine #1 Throttle Idle         | 0=ON                                    | 1=OFF          |               | DISCRETE  | Change    |         |
|      | 14    | Engine #1 Throttle Lockout      | 0=ON                                    | 1=OFF          |               | DISCRETE  | Change    |         |
|      | 15    | Engine #1 Throttle Off          | 0=ON                                    | 1=OFF          |               | DISCRETE  | Change    |         |
| 101  | 2     | Combination                     |   |                |               |           |           |         |
|      | 00-11 | Engine #1 Torque                | 0                                       | 130            | 1.37723069E-1 | UNSIGNED  | 1         | Percent |
|      | 12    | Engine #1 Fire Ext Arm          | 0=OFF                                   | 1=ON           |               | DISCRETE  | Change    |         |
|      | 13    | Spare                           |   |                |               |           |           |         |
|      | 14    | CPG Master Arm                  | 0=Selected                              | 1=Not Selected |               | DISCRETE  | Change    |         |
|      | 15    | Pilot Master Arm                | 0=Selected                              | 1=Not Selected |               | DISCRETE  | Change    |         |
| 102  | 2     | Combination                     |   |                |               |           |           |         |
|      | 00-11 | Engine #1 NG                    | 5                                       | 110            | 6.3476563E-2  | UNSIGNED  | 0.5       | Percent |
|      | 12-13 | Engine #1 Anti-Ice VLV'S Status | 0=SPARE, 1=OFF/OPEN, 2=ON/CLSD, 3=SPARE |                |               | CODED     | Change    |         |
|      | 14-15 | Engine #1 Anti-Ice HTR Status   | 0=SPARE, 1=OFF, 2=ON, 3=SPARE           |                |               | CODED     | Change    |         |
| 103  | 2     | Combination                     |   |                |               |           |           |         |
|      | 00-11 | Engine #1 NP                    | 30                                      | 125            | 6.3476563E-2  | UNSIGNED  | 1         | Percent |
|      | 12    | EGI Body Velocity Valid         | 0=NOT VALID                             | 1=VALID        |               | DISCRETE  | Change    |         |
|      | 13    | EGI Attitude Valid              | 0=NOT VALID                             | 1=VALID        |               | DISCRETE  | Change    |         |
|      | 14    | EGI True Heading Valid          | 0=NOT VALID                             | 1=VALID        |               | DISCRETE  | Change    |         |
|      | 15    | EGI Inertial System Valid       | 0=NOT VALID                             | 1=VALID        |               | DISCRETE  | Change    |         |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description                    | MINVAL                                  | MAXVAL   | Resolution    | Data Type | Threshold | Units   |
|------|-------|--------------------------------|---|----------|---------------|-----------|-----------|---------|
| 104  | 2     | Combination                    |   |          |               |           |           |         |
|      | 00-11 | Engine #2 TGT                  | 0                                       | 1000     | 4.8828125E-1  | UNSIGNED  | 5         | DEG C   |
|      | 12    | Engine #2 Throttle Fly         | 0=ON                                    | 1=OFF    |               | DISCRETE  | Change    |         |
|      | 13    | Engine #2 Throttle Idle        | 0=ON                                    | 1=OFF    |               | DISCRETE  | Change    |         |
|      | 14    | Engine #2 Throttle Lockout     | 0=ON                                    | 1=OFF    |               | DISCRETE  | Change    |         |
|      | 15    | Engine #2 Throttle Off         | 0=ON                                    | 1=OFF    |               | DISCRETE  | Change    |         |
| 105  | 2     | Combination                    |   |          |               |           |           |         |
|      | 00-11 | Engine #2 Torque               | 0                                       | 130      | 1.37723069E-1 | UNSIGNED  | 1         | Percent |
|      | 12    | Engine #2 Fire Ext Arm         | 0=OFF                                   | 1=ON     |               | DISCRETE  | Change    |         |
|      | 13    | Spare                          |   |          |               |           |           |         |
|      | 14    | Refuel Valve Closed            | 0=NOT CLOSED                            | 1=CLOSED |               | DISCRETE  | Change    |         |
|      | 15    | Refuel Valve Open              | 0=NOT OPEN                              | 1=OPEN   |               | DISCRETE  | Change    |         |
| 106  | 2     | Combination                    |   |          |               |           |           |         |
|      | 00-11 | Engine #2 NG                   | 5                                       | 110      | 6.3476563E-2  | UNSIGNED  | 0.5       | Percent |
|      | 12-13 | Engine #2 Anti-Ice VLVS Status | 0=SPARE, 1=OFF/OPEN, 2=ON/CLSD, 3=SPARE |          |               | CODED     | Change    |         |
|      | 14-15 | Engine #2 Anti-Ice HTR Status  | 0=SPARE, 1=OFF, 2=ON, 3=SPARE           |          |               | CODED     | Change    |         |
| 107  | 2     | Combination                    |   |          |               |           |           |         |
|      | 00-11 | Engine #2 NP                   | 30                                      | 125      | 6.3476563E-2  | UNSIGNED  | 1         | Percent |
|      | 12    | EGI Earth Velocity Valid       | 0=NOT VALID                             | 1=VALID  |               | DISCRETE  | Change    |         |
|      | 13    | EGI Mag Variation Valid        | 0=NOT VALID                             | 1=VALID  |               | DISCRETE  | Change    |         |
|      | 14    | EGI INU ID                     | 0=INU1                                  | 1=INU2   |               | DISCRETE  | Change    |         |
|      | 15    | EGI TAG Valid                  | 0=NOT VALID                             | 1=VALID  |               | DISCRETE  | Change    |         |



# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description          | MINVAL          | MAXVAL          | Resolution      | Data Type | Threshold  | Units               |
|------|-------|----------------------|-----------------|-----------------|-----------------|-----------|------------|---------------------|
| 108  | 2     | Combination          |                 |                 |                 |           |            |                     |
|      | 00-11 | Main Rotor RPM       | 5               | 130             | 6.3476563E-2    | UNSIGNED  | 1          | Percent             |
|      | 12    | Stab Trail Edge Up   | 0=NOT BEEP UP   | 1=BEEP UP       |                 | DISCRETE  | Change     |                     |
|      | 13    | Stab Trail Edge Down | 0=NOT BEEP DOWN | 1=BEEP DOWN     |                 | DISCRETE  | Change     |                     |
|      | 14    | Man Stab             | 0=MANUAL        | 1=AUTOMATIC     |                 | DISCRETE  | Change     |                     |
|      | 15    | Spare                |                 |                 |                 |           |            |                     |
| 109  | 2     | Combination          |                 |                 |                 |           |            |                     |
|      | 00-11 | Altitude AGL (RADAR) | 0               | 1428.57         | -6.97543945E-1  | 2'S COMP  | See Note 1 | Feet                |
|      | 12    | Altitude Hold        | 0=OFF           | 1=ON            |                 | DISCRETE  | Change     |                     |
|      | 13    | Radar Altitude Valid | 0=INVALID       | 1=VALID         |                 | DISCRETE  | Change     |                     |
|      | 14    | Attitude Hold        | 0=OFF           | 1=ON            |                 | DISCRETE  | Change     |                     |
|      | 15    | Hover Hold Mode      | 0=OFF           | 1=ON            |                 | DISCRETE  | Change     |                     |
| 110  | 2     | Vertical Airspeed    | -5000           | 5000            | +3.051757812E-1 | 2'S COMP  | 50 ft./min | ft./minute          |
| 111  | 2     | CPG Head Pos. I      | -1              | +9.999694824E-1 | +3.051757812E-5 | 2'S COMP  | 0.0999984  | Directional Cosines |
| 112  | 2     | CPG Head Pos. J      | -1              | +9.999694824E-1 | +3.051757812E-5 | 2'S COMP  | 0.0999984  | Directional Cosines |
| 113  | 2     | CPG Head Pos. K      | -1              | +9.999694824E-1 | +3.051757812E-5 | 2'S COMP  | 0.0999984  | Directional Cosines |
| 114  | 2     | PLT Head Pos. I      | -1              | +9.999694824E-1 | +3.051757812E-5 | 2'S COMP  | 0.0999984  | Directional Cosines |
| 115  | 2     | PLT Head Pos. J      | -1              | +9.999694824E-1 | +3.051757812E-5 | 2'S COMP  | 0.0999984  | Directional Cosines |
| 116  | 2     | PLT Head Pos. K      | -1              | +9.999694824E-1 | +3.051757812E-5 | 2'S COMP  | 0.0999984  | Directional Cosines |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description                      | MINVAL         | MAXVAL            | Resolution      | Data Type | Threshold | Units            |
|------|-------|----------------------------------|----------------|-------------------|-----------------|-----------|-----------|------------------|
| 117  | 2     | Altitude MSL                     | -2300          | +2000             | +1.00000000E+0  | 2'S COMP  | 50        | Feet             |
| 118  | 2     | Outside Air Temp                 | -55            | +5.49983215E+1    | +1.67846679E-3  | 2'S COMP  | 2         | DEG C            |
| 119  | 2     | Lateral Airspeed                 | -50            | +50               | +3.051757812E-3 | 2'S COMP  | 2         | Knots            |
| 120  | 2     | Longitudinal Airspeed            | -50            | +210              | +7.81250000E-3  | 2'S COMP  | 2         | Knots            |
| 121  | 2     | Long Accel (Ax)                  | -128           | +1.279960937E+2   | +3.906250000E-3 | 2'S COMP  | 0.5       | m/s/s            |
| 122  | 2     | Lateral Accel (Ay)               | -128           | +1.279960937E+2   | +3.906250000E-3 | 2'S COMP  | 0.5       | m/s/s            |
| 123  | 2     | Vertical Accel (Az)              | -125           | +1.279960937E+2   | +3.906250000E-3 | 2'S COMP  | 0.98      | m/s/s            |
| 124  | 2     | Pitch Angle                      | -0.5           | +0.5              | +3.051757812E-5 | 2'S COMP  | 0.011111  | Semicircles      |
| 125  | 2     | Roll Angle                       | -1             | +9.999694824E-1   | +3.051757812E-5 | 2'S COMP  | 0.011111  | Semicircles      |
| 126  | 2     | Side Slip Angle                  | -180           | +1.799945068E+2   | +5.493164062E-3 | 2'S COMP  | 2         | Degrees          |
| 127  | 2     | Roll Rate                        | -4             | +3.999877929E+0   | +1.220703125E-4 | 2'S COMP  | 0.011111  | Semicircles /sec |
| 128  | 2     | Pitch Rate                       | -4             | +3.999877929E+0   | +1.220703125E-4 | 2'S COMP  | 0.011111  | Semicircles /sec |
| 129  | 2     | Yaw Rate                         | -4             | +3.999877929E+0   | +1.220703125E-4 | 2'S COMP  | 0.011111  | Semicircles /sec |
| 130  | 2     | Combination                      |                |                   |                 |           |           |                  |
|      | 00-11 | Pilot Pitch Stk Pos              | -4.28144200E+0 | +5.59293300E+0    | +4.211230468E-3 | 2'S COMP  | 0.1       | Inches           |
|      | 12    | Pilot Master Warning Acknowledge | 0=SELECTED     | 1=NOT<br>SELECTED |                 | DISCRETE  | Change    |                  |
|      | 13    | Pilot Master Caution Acknowledge | 0=SELECTED     | 1=NOT<br>SELECTED |                 | DISCRETE  | Change    |                  |
|      | 14    | CPG Master Warning Acknowledge   | 0=SELECTED     | 1=NOT<br>SELECTED |                 | DISCRETE  | Change    |                  |
|      | 15    | CPG Master Caution Acknowledge   | 0=SELECTED     | 1=NOT<br>SELECTED |                 | DISCRETE  | Change    |                  |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description                 | MINVAL          | MAXVAL          | Resolution       | Data Type | Threshold | Units  |
|------|-------|-----------------------------|-----------------|-----------------|------------------|-----------|-----------|--------|
| 131  | 2     | Combination                 |                 |                 |                  |           |           |        |
|      | 00-11 | Pilot Roll Stk Pos          | -4.418152300E+0 | +4.372274000E+0 | +3.529785156E-3  | 2'S COMP  | 0.1       | Inches |
|      | 12    | ASE Pitch                   | 0=OFF           | 1=ON            |                  | DISCRETE  | Change    |        |
|      | 13    | ASE Roll                    | 0=OFF           | 1=ON            |                  | DISCRETE  | Change    |        |
|      | 14    | ASE Yaw                     | 0=OFF           | 1=ON            |                  | DISCRETE  | Change    |        |
|      | 15    | ASE Collective              | 0=OFF           | 1=ON            |                  | DISCRETE  | Change    |        |
| 132  | 2     | Combination                 |                 |                 |                  |           |           |        |
|      | 00-11 | Pilot Cltv Stk Pos          | -5.663252000E+0 | +5.416180000E+0 | +4.663465625E-3  | 2'S COMP  | 0.25      | Inches |
|      | 12    | ASE NOE/Approach            | 0=OFF           | 1=ON            |                  | DISCRETE  | Change    |        |
|      | 13    | ASE Trim                    | 0=OFF           | 1=ON            |                  | DISCRETE  | Change    |        |
|      | 14-15 | Spare                       |                 |                 |                  |           |           |        |
| 133  | 2     | Combination                 |                 |                 |                  |           |           |        |
|      | 00-11 | Pilot YAW Pedal Pos         | -2.507613000E+0 | +2.954104000E+0 | +2.6345214843E-3 | 2'S COMP  | 0.0225    | Inches |
|      | 12    | EGI Altitude Valid          | 0=NOT VALID     | 1=VALID         |                  | DISCRETE  | Change    |        |
|      | 13    | EGI Wander Frame Valid      | 0=NOT VALID     | 1=VALID         |                  | DISCRETE  | Change    |        |
|      | 14    | EGI Vertical Velocity Valid | 0=NOT VALID     | 1=VALID         |                  | DISCRETE  | Change    |        |
|      | 15    | EGI Health Status           | 0=NOT VALID     | 1=VALID         |                  | DISCRETE  | Change    |        |
| 134  | 2     | Combination                 |                 |                 |                  |           |           |        |
|      | 00-11 | Pitch RAM A Actuator        | -1.790000000E+0 | +1.790000000E+0 | +1.5631542968E-3 | 2'S COMP  | 0.038     | Inches |
|      | 12    | EGI Doppler Aiding          | 0=NOT APPLIED   | 1=APPLIED       |                  | DISCRETE  | Change    |        |
|      | 13-15 | Spare                       |                 |                 |                  |           |           |        |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description         | MINVAL | MAXVAL | Resolution       | Data Type | Threshold | Units  |
|------|-------|---------------------|--------|--------|------------------|-----------|-----------|--------|
| 135  | 2     | Combination         |        |        |                  |           |           |        |
|      | 00-11 | Roll RAM A Actuator | -1.79  | +1.79  | +1.5631542968E-3 | 2'S COMP  | 0.038     | Inches |
|      | 12-13 | Right Probe Count   | 0      | 3      | 1                | UNSIGNED  | Change    | Count  |
|      | 14-15 | Left Probe Count    | 0      | 3      | 1                | UNSIGNED  | Change    | Count  |
| 136  | 2     | Combination         |        |        |                  |           |           |        |
|      | 00-11 | YAW RAM A Actuator  | -0.915 | +0.729 | +1.5631542968E-3 | 2'S COMP  | 0.016     | Inches |
|      | 12-15 | Spare               |        |        |                  |           |           |        |
| 137  | 2     | Combination         |        |        |                  |           |           |        |
|      | 00-11 | Cliv RAM A Actuator | -1.79  | +1.79  | +1.5631542968E-3 | 2'S COMP  | 0.038     | Inches |
|      | 12-15 | Spare               |        |        |                  |           |           |        |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description          | MINVAL  | MAXVAL             | Resolution | Data Type | Threshold | Units |
|------|-------|----------------------|---|--------------------|------------|-----------|-----------|-------|
| 138  | 2     | Combination          |   |                    |            |           |           |       |
|      | 00-02 | Pilot Radio Select   | 0=SPARE,1=R1 VHF,2=R2 UHF,3=R3 FM1,4=R4 FM2,5-7=SPARE |                    |            | CODED     | Change    |       |
|      | 03-05 | CPG Radio Select     | 0=SPARE,1=R1 VHF,2=R2 UHF,3=R3 FM1,4=R4 FM2,5-7=SPARE |                    |            | CODED     | Change    |       |
|      | 06    | Pilot Intercom       | 0=NO SELECT   | 1=SELECT           |            | DISCRETE  | Change    |       |
|      | 07    | CPG Intercom         | 0=NO SELECT   | 1=SELECT           |            | DISCRETE  | Change    |       |
|      | 08    | Pilot Radio Xmit     | 0=NO SELECT   | 1=SELECT           |            | DISCRETE  | Change    |       |
|      | 09    | CPG Radio Xmit       | 0=NO SELECT   | 1=SELECT           |            | DISCRETE  | Change    |       |
|      | 10    | APU Fire Ext Arm     | 0=OFF   | 1=ON               |            | DISCRETE  | Change    |       |
|      | 11    | Weapons Triggers     | 0=NO TRIGGER  | 1=WPN TRIGGER      |            | DISCRETE  | Change    |       |
|      | 12    | TADS System Fail     | 0=NO FAILURES   | 1=FAILURES PRESENT |            | DISCRETE  | Change    |       |
|      | 13    | PNVS System Fail     | 0=NO FAILURES   | 1=FAILURES PRESENT |            | DISCRETE  | Change    |       |
|      | 14    | PLT/CPG Emer Hyd Sel | 0=NOT ACTIVATED                                       | 1=ACTIVATED        |            | DISCRETE  | Change    |       |
|      | 15    | Guard Receiver Mode  | 0=OFF   | 1=ON               |            | DISCRETE  | Change    |       |

Safety Data Parameters (Continued)

| Type | Bytes | Description                  | MINVAL                               | MAXVAL     | Resolution | Data Type | Threshold | Units |
|------|-------|------------------------------|--------------------------------------|------------|------------|-----------|-----------|-------|
| 139  | 2     | Combination                  |                                      |            |            |           |           |       |
|      | 00-01 | Man Fuel Xfer Fwd Sel        | 0=SPARE, 1=OFF, 2=ON, 3=SPARE        |            |            | CODED     | Change    |       |
|      | 02-03 | Man Fuel Xfer Aft Sel        | 0=SPARE, 1=OFF, 2=ON, 3=SPARE        |            |            | CODED     | Change    |       |
|      | 04-05 | Fuel Crossfeed 1 Fwd         | 0=SPARE, 1=OFF, 2=ON, 3=SPARE        |            |            | CODED     | Change    |       |
|      | 06-07 | Fuel Crossfeed 1 Aft         | 0=SPARE, 1=OFF, 2=ON, 3=SPARE        |            |            | CODED     | Change    |       |
|      | 08-09 | Fuel Crossfeed 1 Norm        | 0=SPARE, 1=OFF, 2=ON, 3=SPARE        |            |            | CODED     | Change    |       |
|      | 10-11 | Fuel Crossfeed 2 Fwd         | 0=SPARE, 1=OFF, 2=ON, 3=SPARE        |            |            | CODED     | Change    |       |
|      | 12-13 | Fuel Crossfeed 2 Aft         | 0=SPARE, 1=OFF, 2=ON, 3=SPARE        |            |            | CODED     | Change    |       |
|      | 14-15 | Fuel Crossfeed 2 Norm        | 0=SPARE, 1=OFF, 2=ON, 3=SPARE        |            |            | CODED     | Change    |       |
| 140  | 2     | Combination                  |                                      |            |            |           |           |       |
|      | 00-01 | Fuel Trans MAN / AUTO Select | 0=NO CHNG, 1=AUTO, 2=MANUAL, 3=SPARE |            |            | CODED     | Change    |       |
|      | 02-03 | Fuel Xfer Mode               | 0=NO CHNG, 1=FWD, 2=AFT, 3=NORMAL    |            |            | CODED     | Change    |       |
|      | 04-05 | Fuel Crossfeed Select        | 0=NO CHNG, 1=AFT, 2=FWD, 3=NORMAL    |            |            | CODED     | Change    |       |
|      | 06-07 | Fuel Crossfeed Mode          | 0=OFF, 1=AFT, 2=FWD, 3=NORMAL        |            |            | CODED     | Change    |       |
|      | 08    | Boost Pump On                | 0=OFF                                | 1=ON       |            | DISCRETE  | Change    |       |
|      | 09    | Left Squat Switch            | 0=GROUND                             | 1=AIRBORNE |            | DISCRETE  | Change    |       |
|      | 10    | Clu Squat Switch             | 0=OFF                                | 1=ON       |            | DISCRETE  | Change    |       |
|      | 11    | DP1 SQUAT SW                 | 0=IN AIR                             | 1=ON GND   |            | DISCRETE  | Change    |       |
|      | 12    | DP2 SQUAT SW                 | 0=IN AIR                             | 1=ON GND   |            | DISCRETE  | Change    |       |
|      | 13    | WP1 SQUAT SW                 | 0=IN AIR                             | 1=ON GND   |            | DISCRETE  | Change    |       |
|      | 14    | WP2 SQUAT SW                 | 0=IN AIR                             | 1=ON GND   |            | DISCRETE  | Change    |       |
|      | 15    | SP SQUAT SW                  | 0=IN AIR                             | 1=ON GND   |            | DISCRETE  | Change    |       |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description               | MINVAL   | MAXVAL          | Resolution      | Data Type | Threshold | Units  |
|------|-------|---------------------------|--|-----------------|-----------------|-----------|-----------|--------|
| 141  | 2     | Combination               |  |                 |                 |           |           |        |
|      | 00    | CPG Long ARDD             | 0=COUPLED  | 1=DECOUPLED     |                 | DISCRETE  | Change    |        |
|      | 01    | CPG Lateral ARDD          | 0=COUPLED  | 1=DECOUPLED     |                 | DISCRETE  | Change    |        |
|      | 02    | CPG Direct ARDD           | 0=COUPLED  | 1=DECOUPLED     |                 | DISCRETE  | Change    |        |
|      | 03    | CPG Collective ARDD       | 0=COUPLED  | 1=DECOUPLED     |                 | DISCRETE  | Change    |        |
|      | 04    | PLT Long ARDD             | 0=COUPLED  | 1=DECOUPLED     |                 | DISCRETE  | Change    |        |
|      | 05    | PLT Lateral ARDD          | 0=COUPLED  | 1=DECOUPLED     |                 | DISCRETE  | Change    |        |
|      | 06    | PLT Direct ARDD           | 0=COUPLED  | 1=DECOUPLED     |                 | DISCRETE  | Change    |        |
|      | 07    | PLT Collective ARDD       | 0=COUPLED  | 1=DECOUPLED     |                 | DISCRETE  | Change    |        |
|      | 08    | GPS Time Sync             | 0=GPS Time sync not in progress, 1=GPS Time sync in progress |                 |                 | CODED     | Change    |        |
|      | 09-15 | Spare                     |  |                 |                 |           |           |        |
| 142  | 2     | Calibrated Airspeed       | 0  | 210             | +7.8125E-3      | 2's COMP  | 2 Knots   | Knots  |
| 143  | 2     | Combination               |  |                 |                 |           |           |        |
|      | 00-11 | CPG Pitch Stick Position  | -4.28144200E+0   | +5.59293300E+0  | 4.211230468E-3  | 2's COMP  | 0.1       | Inches |
|      | 12    | Long SCAS Solenoid Status | 0=DISENGAGED   | 1=ENGAGED       |                 | DISCRETE  | Change    |        |
|      | 13    | Lat SCAS Solenoid Status  | 0=DISENGAGED   | 1=ENGAGED       |                 | DISCRETE  | Change    |        |
|      | 14    | Dir SCAS Solenoid Status  | 0=DISENGAGED   | 1=ENGAGED       |                 | DISCRETE  | Change    |        |
|      | 15    | Cltv SCAS Solenoid Status | 0=DISENGAGED   | 1=ENGAGED       |                 | DISCRETE  | Change    |        |
| 144  | 2     | Combination               |  |                 |                 |           |           |        |
|      | 00-11 | CPG Roll Stick Position   | -4.418152300E+0  | +4.372274000E+0 | +3.529785156E-3 | 2's COMP  | 0.1       | Inches |
|      | 12    | Long BUCS Solenoid Status | 0=DISENGAGED   | 1=ENGAGED       |                 | DISCRETE  | Change    |        |
|      | 13    | Lat BUCS Solenoid Status  | 0=DISENGAGED   | 1=ENGAGED       |                 | DISCRETE  | Change    |        |
|      | 14    | Dir BUCS Solenoid Status  | 0=DISENGAGED   | 1=ENGAGED       |                 | DISCRETE  | Change    |        |
|      | 15    | Cltv BUCS Solenoid Status | 0=DISENGAGED   | 1=ENGAGED       |                 | DISCRETE  | Change    |        |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description                      | MINVAL          | MAXVAL          | Resolution      | Data Type | Threshold | Units      |
|------|-------|----------------------------------|-----------------|-----------------|-----------------|-----------|-----------|------------|
| 145  | 2     | Combination                      |                 |                 |                 |           |           |            |
|      | 00-11 | CPG Yaw Pedal Position           | -2.501750000E+0 | +2.947197000E+0 | +2.698222456E-3 | 2'S COMP  | 0.0225    | Inches     |
|      | 12    | Pitch SAS Saturated              | 0=OFF           | 1=ON            |                 | DISCRETE  | Change    |            |
|      | 13    | Roll SAS Saturated               | 0=OFF           | 1=ON            |                 | DISCRETE  | Change    |            |
|      | 14    | Yaw SAS Saturated                | 0=OFF           | 1=ON            |                 | DISCRETE  | Change    |            |
|      | 15    | Clty SAS Saturated               | 0=OFF           | 1=ON            |                 | DISCRETE  | Change    |            |
| 146  | 2     | Combination                      |                 |                 |                 |           |           |            |
|      | 00-11 | CPG Clty Stick Position          | -5.663252000E+0 | +5.416180000E+0 | 4.663476562E-3  | 2'S COMP  | 0.25      | Inches     |
|      | 12    | Pitch Stick Moved                | 0=NOT MOVED     | 1=MOVED         |                 | DISCRETE  | Change    |            |
|      | 13    | Roll Stick Moved                 | 0=NOT MOVED     | 1=MOVED         |                 | DISCRETE  | Change    |            |
|      | 14    | Yaw Stick Moved                  | 0=NOT MOVED     | 1=MOVED         |                 | DISCRETE  | Change    |            |
|      | 15    | Clty Stick Moved                 | 0=NOT MOVED     | 1=MOVED         |                 | DISCRETE  | Change    |            |
| 147  | 2     | Combination                      |                 |                 |                 |           |           |            |
|      | 00-11 | Longitudinal SAS Sleeve Position | -0.044          | +0.088          | 5.6523437E-5    | 2'S COMP  | 0.0011305 | Inches     |
|      | 12    | Long SAS Sleeve Position Frame   | 0=FRAME A       | 1=FRAME B       |                 | DISCRETE  | Change    | See Note 2 |
|      | 13    | Any Tracers Invalid              | 0=NOT VALID     | 1=VALID         |                 | DISCRETE  | Change    |            |
|      | 14    | Turn Coordination                | 0=OFF           | 1=ON            |                 | DISCRETE  | Change    |            |
|      | 15    | Static Air Temperature Valid     | 0=VALID         | 1=NOT VALID     |                 | DISCRETE  | Change    |            |
| 148  | 2     | Combination                      |                 |                 |                 |           |           |            |
|      | 00-11 | Lateral SAS Sleeve Position      | -0.088          | +0.088          | 5.6523437E-5    | 2'S COMP  | 0.0011305 | Inches     |
|      | 12    | Lat SAS Sleeve Position Frame    | 0=FRAME A       | 1=FRAME B       |                 | DISCRETE  | Change    | See Note 2 |
|      | 13    | Long/Lat Not Filtered Valid      | 0=VALID         | 1=NOT VALID     |                 | DISCRETE  | Change    |            |
|      | 14    | Long TAS Filtered Valid          | 0=VALID         | 1=NOT VALID     |                 | DISCRETE  | Change    |            |
|      | 15    | Lat TAS Filtered Valid           | 0=VALID         | 1=NOT VALID     |                 | DISCRETE  | Change    |            |



# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description                      | MINVAL         | MAXVAL     | Resolution    | Data Type | Threshold | Units      |
|------|-------|----------------------------------|----------------|------------|---------------|-----------|-----------|------------|
| 149  | 2     | Combination                      |                |            |               |           |           |            |
|      | 00-11 | Directional SAS Sleeve Position  | -0.044         | +0.044     | 5.6523437E-5  | 2's COMP  | 0.0011305 | Inches     |
|      | 12    | Dir SAS Sleeve Position Frame    | 0=FRAME A      | 1=FRAME B  |               | DISCRETE  | Change    | See Note 2 |
|      | 13-15 | Spare                            |                |            |               |           |           |            |
| 150  | 2     | Combination                      |                |            |               |           |           |            |
|      | 00-11 | Collective SAS Sleeve Position   | -0.088         | +0.088     | 5.6523437E-5  | 2's COMP  | 0.0011305 | Inches     |
|      | 12    | Cliv SAS Sleeve Position Frame   | 0=FRAME A      | 1=FRAME B  |               | DISCRETE  | Change    | See Note 2 |
|      | 13-15 | Spare                            |                |            |               |           |           |            |
| 151  | 2     | FMC Pressure Altitude            | -2300          | 20,000     | 1             | 2's COMP  | 50        | Feet       |
| 152  | 2     | Combination                      |                |            |               |           |           |            |
|      | 00-12 | Pilot Longitudinal RVDT Position | -20            | +20        | 4.39453125E-2 | 2's COMP  | 0.4       | Degrees    |
|      | 13    | BUCS CPG LVDT                    | 0=NOT SELECTED | 1=SELECTED |               | DISCRETE  | Change    |            |
|      | 14    | Rotor Brake Engaged              | 0=NOT ENGAGED  | 1=ENGAGED  |               | DISCRETE  | Change    |            |
|      | 15    | All Hold Disengage Software      | 0=NOT SELECTED | 1=SELECTED |               | DISCRETE  | Change    |            |
| 153  | 2     | Combination                      |                |            |               |           |           |            |
|      | 00-12 | Pilot Lateral RVDT Position      | -20            | +20        | 4.39453125E-2 | 2's COMP  | 0.4       | Degrees    |
|      | 13    | Yaw Ground Mode                  | 0=OFF          | 1=ON       |               | DISCRETE  | Change    |            |
|      | 14    | Hover Box Valid                  | 0=NOT VALID    | 1=VALID    |               | DISCRETE  | Change    |            |
|      | 15    | EGI Source In Progress           | 0=RADAR ALT    | 1=BARO ALT |               | DISCRETE  | Change    |            |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description                              | MINVAL  | MAXVAL        | Resolution    | Data Type | Threshold | Units   |
|------|-------|--|---|---------------|---------------|-----------|-----------|---------|
| 154  | 2     | Combination                              |   |               |               |           |           |         |
|      | 00-12 | Pilot Directional RVDY Position          | -20   | +20           | 4.39453125E-2 | 2'S COMP  | 0.4       | Degrees |
|      | 13    | Preflight Test Status                    | 0=NOT IN PROGRESS   | 1=IN PROGRESS |               | DISCRETE  | Change    |         |
|      | 14    | Maintenance Test Status                  | 0=NOT IN PROGRESS   | 1=IN PROGRESS |               | DISCRETE  | Change    |         |
|      | 15    | CPC BUCS LVDT                            | 0=NOT SELECTED  | 1=SELECTED    |               | DISCRETE  | Change    |         |
| 155  | 2     | Combination                              |   |               |               |           |           |         |
|      | 00-12 | Pilot Collective RVDY Position           | -20   | +20           | 4.39453125E-2 | 2'S COMP  | 0.4       | Degrees |
|      | 13-15 | ECI CTS Horizontal Dilution of Precision | 0=NO DATA, 1=0-1, 2=1-2, 3=2-3, 4=3-4, 5=4-5, 6=5-6, 7=>6 |               |               | DISCRETE  | Change    |         |
| 156  | 2     | Combination                              |   |               |               |           |           |         |
|      | 00-12 | CPC Longitudinal RVDY Position           | -20   | +20           | 4.39453125E-2 | 2'S COMP  | 0.4       | Degrees |
|      | 13    | Weapon Training Mode Status              | 0=OFF   | 1=ON          |               | DISCRETE  | Change    |         |
|      | 14    | HADS Valid                               | 0=NOT VALID   | 1=VALID       |               | DISCRETE  | Change    |         |
|      | 15    | HADS Fail                                | 0=NOT FAIL  | 1=FAIL        |               | DISCRETE  | Change    |         |
| 157  | 2     | Combination                              |   |               |               |           |           |         |
|      | 00-12 | CPC Lateral RVDY Position                | -20   | +20           | 4.39453125E-2 | 2'S COMP  | 0.4       | Degrees |
|      | 13    | Probe Switch                             | 0=NOT TRUE  | 1=TRUE        |               | DISCRETE  | Change    |         |
|      | 14    | HIADC Change Probe Request Override      | 0=NOT TRUE  | 1=TRUE        |               | DISCRETE  | Change    |         |
|      | 15    | Spare                                    |   |               |               |           |           |         |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description                   | MINVAL                               | MAXVAL      | Resolution    | Data Type | Threshold  | Units   |
|------|-------|-------------------------------|--------------------------------------|-------------|---------------|-----------|------------|---------|
| 158  | 2     | Combination                   |                                      |             |               |           |            |         |
|      | 00-12 | CPG Directional RVDY Position | -20                                  | +20         | 4.39453125E-2 | 2'S COMP  | 0.4        | Degrees |
|      | 13    | FMC Pressure Altitude Valid   | 0=VALID                              | 1=NOT VALID |               | DISCRETE  | Change     |         |
|      | 14    | FMC Long TAS Selected Valid   | 0=VALID                              | 1=NOT VALID |               | DISCRETE  | Change     |         |
|      | 15    | FMC Lat TAS Selected Valid    | 0=VALID                              | 1=NOT VALID |               | DISCRETE  | Change     |         |
| 159  | 2     | Combination                   |                                      |             |               |           |            |         |
|      | 00-12 | CPG Collective RVDY Position  | -20                                  | +20         | 4.39453125E-2 | 2'S COMP  | 0.4        | Degrees |
|      | 13-15 | TESS MODE                     | 0=INACTIVE 1=NOT RDY 2=RDY 3-7=SPARE |             |               | DISCRETE  | Change     |         |
| 172  | 2     | Combination                   |                                      |             |               |           |            |         |
|      | 00-07 | DP1 Cumulative Throughput     | 0                                    | 100         | 1             | UNSIGNED  | See Note 3 | Percent |
|      | 08-15 | DP2 Cumulative Throughput     | 0                                    | 100         | 1             | UNSIGNED  | See Note 3 | Percent |
| 173  | 2     | Combination                   |                                      |             |               |           |            |         |
|      | 00-07 | CPG LH MPD Display Format     | 0                                    | 255         | 1             | UNSIGNED  | 1          | Format  |
|      | 08-15 | CPH RH MPD Display Format     | 0                                    | 255         | 1             | UNSIGNED  | 1          | Format  |
| 174  | 2     | Combination                   |                                      |             |               |           |            |         |
|      | 00-07 | PLT LH MPD Display Format     | 0                                    | 255         | 1             | UNSIGNED  | 1          | Format  |
|      | 08-15 | PLT RH MPD Display Format     | 0                                    | 255         | 1             | UNSIGNED  | 1          | Format  |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description               | MINVAL   | MAXVAL | Resolution | Data Type | Threshold | Units |
|------|-------|---------------------------|--|--------|------------|-----------|-----------|-------|
| 175  | 2     | Combination               |  |        |            |           |           |       |
|      | 00-02 | CPG LH MPD Video Underlay | 0=NONE 1=TADS 2=CHMD 3=SPARE 4=CSIGHT 5=PSIGHT 6=PHMD 7=SPARE            |        |            | UNSIGNED  | Change    |       |
|      | 03-05 | CPG RH MPD Video Underlay | 0=NONE 1=TADS 2=CHMD 3=SPARE 4=CSIGHT 5=PSIGHT 6=PHMD 7=SPARE            |        |            | UNSIGNED  | Change    |       |
|      | 06-08 | PLT LH MPD Video Underlay | 0=NONE 1=TADS 2=CHMD 3=SPARE 4=CSIGHT 5=PSIGHT 6=PHMD 7=SPARE            |        |            | UNSIGNED  | Change    |       |
|      | 09-11 | PLT RH MPD Video Underlay | 0=NONE 1=TADS 2=CHMD 3=SPARE 4=CSIGHT 5=PSIGHT 6=PHMD 7=SPARE            |        |            | UNSIGNED  | Change    |       |
|      | 12-15 | Spare                     |  |        |            |           |           |       |
| 176  | 2     | Combination               |  |        |            |           |           |       |
|      | 00-02 | DP1 Mode Command          | 0=NO OPERATION 1=SINGLE DP 2=NORMAL SECONDARY 3=NORMAL PRIMARY 4-7=SPARE |        |            | UNSIGNED  | Change    |       |
|      | 03-05 | DP2 Mode Command          | 0=NO OPERATION 1=SINGLE DP 2=NORMAL SECONDARY 3=NORMAL PRIMARY 4-7=SPARE |        |            | UNSIGNED  | Change    |       |
|      | 06    | DP1 CRGP1 Video Underlay  | 0=VALID 1=INVALID  |        |            | DISCRETE  | Change    |       |
|      | 07    | DP1 CRGP2 Video Underlay  | 0=VALID 1=INVALID  |        |            | DISCRETE  | Change    |       |
|      | 08    | DP2 CRGP1 Video Underlay  | 0=VALID 1=INVALID  |        |            | DISCRETE  | Change    |       |
|      | 09    | DP2 CRGP2 Video Underlay  | 0=VALID 1=INVALID  |        |            | DISCRETE  | Change    |       |
|      | 10-15 | Spare                     |  |        |            |           |           |       |
| 177  | 2     | Combination               |  |        |            |           |           |       |
|      | 00    | DP1 MPD1 PBIT In Progress | 0=NOT IN PROGRESS 1=IN PROGRESS  |        |            | DISCRETE  | Change    |       |
|      | 01    | DP1 MPD2 PBIT In Progress | 0=NOT IN PROGRESS 1=IN PROGRESS  |        |            | DISCRETE  | Change    |       |
|      | 02    | DP1 MPD3 PBIT In Progress | 0=NOT IN PROGRESS 1=IN PROGRESS  |        |            | DISCRETE  | Change    |       |

Safety Data Parameters (Continued)

| Type | Bytes | Description               | MINVAL            | MAXVAL        | Resolution | Data Type | Threshold | Units |
|------|-------|---------------------------|-------------------|---------------|------------|-----------|-----------|-------|
|      | 03    | DP1 MPD4 PBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 04    | DP2 MPD1 PBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 05    | DP2 MPD3 PBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 06    | DP2 MPD3 PBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 07    | DP2 MPD4 PBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 08    | DP1 MPD1 IBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 09    | DP1 MPD2 IBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 10    | DP1 MPD3 IBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 11    | DP1 MPD4 IBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 12    | DP2 MPD1 IBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 13    | DP2 MPD2 IBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 14    | DP2 MPD3 IBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |
|      | 15    | DP2 MPD4 IBIT In Progress | 0=NOT IN PROGRESS | 1=IN PROGRESS |            | DISCRETE  | Change    |       |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description                  | MINVAL  | MAXVAL     | Resolution | Data Type | Threshold | Units |
|------|-------|------------------------------|---|------------|------------|-----------|-----------|-------|
| 178  | 2     | Combination                  |   |            |            |           |           |       |
|      | 00-03 | DP1 CRGP1 Palette            | 0=DAY A 1=DAY B 2=DAY C 3=DAY D 4=DAY E 5=NIGHT<br>A 6=NIGHT B 7=NIGHT C 8=NIGHT D 9=NIGHT E<br>10=MONO 11-15=SPARE |            |            | DISCRETE  | Change    |       |
|      | 04-07 | DP1 CRGP2 Palette            | 0=DAY A 1=DAY B 2=DAY C 3=DAY D 4=DAY E 5=NIGHT<br>A 6=NIGHT B 7=NIGHT C 8=NIGHT D 9=NIGHT E<br>10=MONO 11-15=SPARE |            |            | DISCRETE  | Change    |       |
|      | 08-11 | DP2 CRGP1 Palette            | 0=DAY A 1=DAY B 2=DAY C 3=DAY D 4=DAY E 5=NIGHT<br>A 6=NIGHT B 7=NIGHT C 8=NIGHT D 9=NIGHT E<br>10=MONO 11-15=SPARE |            |            | DISCRETE  | Change    |       |
|      | 12-15 | DP2 CRGP2 Palette            | 0=DAY A 1=DAY B 2=DAY C 3=DAY D 4=DAY E 5=NIGHT<br>A 6=NIGHT B 7=NIGHT C 8=NIGHT D 9=NIGHT E<br>10=MONO 11-15=SPARE |            |            | DISCRETE  | Change    |       |
| 179  | 2     | Combination                  |   |            |            |           |           |       |
|      | 00-05 | DP1 MPD1 Soft Key Selections |   | See Note 5 |            | DISCRETE  | Change    |       |
|      | 06-11 | DP1 MPD2 Soft Key Selections |   | See Note 5 |            | DISCRETE  | Change    |       |
|      | 12-15 | Spare                        |   |            |            |           |           |       |
| 180  | 2     | Combination                  |   |            |            |           |           |       |
|      | 00-05 | DP1 MPD3 Soft Key Selections |   | See Note 5 |            | DISCRETE  | Change    |       |
|      | 06-11 | DP1 MPD4 Soft Key Selections |   | See Note 5 |            | DISCRETE  | Change    |       |
|      | 12-15 | Spare                        |   |            |            |           |           |       |
| 181  | 2     | Combination                  |   |            |            |           |           |       |
|      | 00-05 | DP2 MPD1 Soft Key Selections |   | See Note 5 |            | DISCRETE  | Change    |       |
|      | 06-11 | DP2 MPD2 Soft Key Selections |   | See Note 5 |            | DISCRETE  | Change    |       |
|      | 12-15 | Spare                        |   |            |            |           |           |       |

Safety Data Parameters (Continued)

| Type | Bytes | Description                  | MINVAL | MAXVAL        | Resolution     | Data Type | Threshold | Units       |
|------|-------|------------------------------|--------|---------------|----------------|-----------|-----------|-------------|
| 182  | 2     | Combination                  |        |               |                |           |           |             |
|      | 00-05 | DP2 MPD3 Soft Key Selections |        | See Note 5    |                | DISCRETE  | Change    |             |
|      | 06-11 | DP2 MPD4 Soft Key Selections |        | See Note 5    |                | DISCRETE  | Change    |             |
|      | 12-15 | Spare                        |        |               |                |           |           |             |
| 183  | 2     | Combination                  |        |               |                |           |           |             |
|      | 00-03 | DP1 Unhandled Exceptions     | 0      | 15            | 1              | UNSIGNED  | 1         | Exceptions  |
|      | 04-07 | DP2 Unhandled Exceptions     | 0      | 15            | 1              | UNSIGNED  | 1         | Exceptions  |
|      | 08-11 | DP1 Start Number             | 0      | 15            | 1              | UNSIGNED  | 1         | Starts      |
|      | 12-15 | DP2 Start Number             | 0      | 15            | 1              | UNSIGNED  | 1         | Starts      |
| 184  | 2     | Combination                  |        |               |                |           |           |             |
|      | 00-03 | DP1 CRGP1 Reset Counter      | 0      | 15            | 1              | UNSIGNED  | 1         | Resets      |
|      | 04-07 | DP1 CRGP2 Reset Counter      | 0      | 15            | 1              | UNSIGNED  | 1         | Resets      |
|      | 08-11 | DP2 CRGP1 Reset Counter      | 0      | 15            | 1              | UNSIGNED  | 1         | Resets      |
|      | 12-15 | DP2 CRGP2 Reset Counter      | 0      | 15            | 1              | UNSIGNED  | 1         | Resets      |
| 185  | 2     | Longitudinal Velocity (Vx)   | -256   | +255.9921875  | 7.8125E-3      | 2'S COMP  | 1         | meters/sec  |
| 186  | 2     | Lateral Velocity (Vy)        | -256   | +255.9921875  | 7.8125E-3      | 2'S COMP  | 1         | meters/sec  |
| 187  | 2     | Vertical Velocity (Vz)       | -256   | +255.9921875  | 7.8125E-3      | 2'S COMP  | 0.254     | meters/sec  |
| 188  | 2     | Inertial Altitude            | -700   | +8191.75      | 0.25           | 2'S COMP  | 15        | meters      |
| 189  | 2     | Inertial Position Error      | 0      | 127.998046875 | 1.953125E-3    | UNSIGNED  | 0.01524   | kilometers  |
| 190  | 2     | Inertial Velocity Error      | 0      | 511.9921875   | 7.8125E-3      | UNSIGNED  | 1         | meters/sec  |
| 191  | 2     | Inertial Heading Error       | 0      | 1             | 3.0517578E-5   | UNSIGNED  | 0.0002572 | semicircles |
| 192  | 2     | FMC Pitot Airspeed           | 0      | 210           | 7.8125E-3      | 2'S COMP  | 2         | Knots       |
| 193  | 2     | Longitudinal TAS, Filtered   | -50    | +210          | 7.8125E-3      | 2'S COMP  | 2         | Knots       |
| 194  | 2     | Lateral TAS, Filtered        | -50    | +50           | 3.051757812E-5 | 2'S COMP  | 2         | Knots       |

# Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description                  | MINVAL      | MAXVAL         | Resolution     | Data Type | Threshold | Units |
|------|-------|------------------------------|-------------|----------------|----------------|-----------|-----------|-------|
| 195  | 2     | Static Air Temperature       | -55         | -54.9983213332 | 1.678466796E-3 | 2'S COMP  | 2         | Deg C |
| 196  | 2     | Longitudinal TAS, Unfiltered | -50         | 210            | 7.8125E-3      | 2'S COMP  | 2         | Knots |
| 197  | 2     | Lateral TAS, Unfiltered      | -50         | +50            | 3.051757812E-5 | 2'S COMP  | 2         | Knots |
| 198  | 2     | FMC Long TAS Selected        | -50         | +210           | 7.8125E-3      | 2'S COMP  | 2         | Knots |
| 199  | 2     | FMC Lat TAS Selected         | -50         | +50            | 3.051757812E-5 | 2'S COMP  | 2         | Knots |
| 212  | 4     | Combination                  |             |                |                |           |           |       |
|      | 00-31 | Time (Zulu)                  | 00:00:00.00 | 23:59:59.99    | 00:00:00.01    | BCD       | 1 Minute  | Time  |
|      | 00-03 | System Time - Hours 10's     | 0           | 2              | 1              | BCD       |           |       |
|      | 04-07 | System Time - Hours 1's      | 0           | 9              | 1              | BCD       |           |       |
|      | 08-11 | System Time - Minutes 10's   | 0           | 5              | 1              | BCD       |           |       |
|      | 12-15 | System Time - Minutes 1's    | 0           | 9              | 1              | BCD       |           |       |
|      | 16-19 | System Time - Seconds 10's   | 0           | 5              | 1              | BCD       |           |       |
|      | 20-23 | System Time - Seconds 1's    | 0           | 9              | 1              | BCD       |           |       |
|      | 24-27 | System Time - Seconds .1's   | 0           | 9              | 1              | BCD       |           |       |
|      | 28-31 | System Time - Seconds .01's  | 0           | 9              | 1              | BCD       |           |       |
|      |       |                              |             |                |                |           |           |       |



## Appendix C - MDR Data Dictionary

Safety Data Parameters (Continued)

| Type | Bytes | Description          | MINVAL | MAXVAL | Resolution | Data Type | Threshold  | Units   |
|------|-------|----------------------|--------|--------|------------|-----------|------------|---------|
| 233  | 10    | Combination          |        |        |            |           |            |         |
|      | 00-07 | DP1 5 Hz Throughput  | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |
|      | 08-15 | DP2 5 Hz Throughput  | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |
|      | 16-23 | DP1 CRGP1 Throughput | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |
|      | 24-31 | DP1 CRGP2 Throughput | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |
|      | 32-39 | DP1 RGP3 Throughput  | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |
|      | 40-47 | DP1 RGP4 Throughput  | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |
|      | 48-55 | DP2 CRGP1 Throughput | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |
|      | 56-63 | DP2 CRGP2 Throughput | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |
|      | 64-71 | DP2 RGP3 Throughput  | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |
|      | 72-79 | DP2 RGP4 Throughput  | 0      | 100    | 1          | UNSIGNED  | See Note 4 | Percent |

Note 1: Radar altitude threshold is 1 foot when the previous value is below 20 feet, 2 feet when between 20 and 50 feet and 10 feet above 50 feet.

Note 2: The SAS Sleeve Positions are sampled for MDR recording at 12.5Hz. The rest of the MDR data is sampled at 6.25Hz. The FRAME bit indicates if the time of the sample is in-line with the other data (FRAME=0) or if an extra 80ms should be added to the time of occurrence for the SAS Sleeve Position data (FRAME=1).

Note 3: Data Type 172, DP Cumulative Throughput, is recorded once every 5 seconds.

Note 4: Data Type 233, DP Throughputs, is recorded once every 1 seconds.

Note 5: MPD Key selection data is encoded using the MSB of the 6 bit value to indicate the source of the selection (0=MPD Bezel Button, 1=Cyclic Cursor) and the 5 least significant bits to indicate which button/function was selected. The button selection encoding is shown in the table below.

# Appendix C - MDR Data Dictionary

| Button Code | Button Label | Button Code | Button Label | Button Code | Button Label | Button Code | Button Label | Button Code | Button Label |
|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|
| 0           | None         | 8           | T1           | 16          | B3           | 24          | L5           |             |              |
| 1           | FCR          | 9           | T2           | 17          | B4           | 25          | L6           |             |              |
| 2           | WPN          | 10          | T3           | 18          | B5           | 26          | R1           |             |              |
| 3           | TSD          | 11          | T4           | 19          | B6           | 27          | R2           |             |              |
| 4           | A/C          | 12          | T5           | 20          | L1           | 28          | R3           |             |              |
| 5           | COM          | 13          | T6           | 21          | L2           | 29          | R4           |             |              |
| 6           | VID          | 14          | B1           | 22          | L3           | 30          | R5           |             |              |
| 7           | *            | 15          | B2           | 23          | L4           | 31          | R6           |             |              |

| IDR | PARAM ID | PARAMETER COUNT BY IDR CSV FILE ID (COLUMN HEADER IS FILE ID) |       |       |       |       |       |       |       |       |      |     |     |      |     |     |      |      |      |      |       |       |       |       |      |           |           |  |  |
|-----|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|------|-----|-----|------|-----|-----|------|------|------|------|-------|-------|-------|-------|------|-----------|-----------|--|--|
|     |          | MSM#1   | MSM#2 | MSM#3 | MSM#4 | MSM#5 | MSM#6 | MSM#7 | MSM#8 | MSM#9 | 0    | 1   | 2   | 3    | 4   | 5   | 6    | 7    | 8    | 9    | MSM#T | MSM#F | MSM#S | MSM#D | Avg  | Count     | % of All  |  |  |
| 628 | 4        | 63  | 1368  | 6016  | 5     | 89    | 10742 | 10737 | 3     | 105   | 2    | 1   | 1   | 81   | 1   | 1   | 2    | 323  | 446  | 3    | 7     | 10257 | 15776 | 15776 | 2546 | 903       | 0.0324    |  |  |
| 456 | 4        | 63  | 1368  | 6016  | 5     | 89    | 10742 | 10737 | 3     | 105   | 2    | 1   | 1   | 81   | 1   | 1   | 2    | 323  | 446  | 3    | 7     | 10257 | 15776 | 15776 | 2546 | 903       | 0.0324    |  |  |
| 606 | 2        | 66  | 1407  | 6027  | 5     | 90    | 10553 | 10722 | 3     | 115   | 4    | 3   | 2   | 73   | 5   | 3   | 324  | 474  | 2    | 8    | 10234 | 15818 | 15818 | 2542  | 727  | 0.094298  |           |  |  |
| 20  | 2        | 66  | 1407  | 6027  | 5     | 90    | 10553 | 10722 | 3     | 115   | 4    | 3   | 2   | 73   | 5   | 3   | 324  | 474  | 2    | 8    | 10234 | 15818 | 15818 | 2540  | 727  | 0.1252179 |           |  |  |
| 934 | 1081     | 929   | 2193  | 3279  | 503   | 467   | 6198  | 8994  | 1029  | 2248  | 943  | 317 | 509 | 1064 | 768 | 634 | 1306 | 3550 | 629  | 1896 | 6501  | 5614  | 5614  | 2033  | 727  | 0.195252  |           |  |  |
| 435 | 2        | 87  | 1115  | 5325  | 2     | 111   | 7013  | 7679  | 3     | 211   | 111  | 54  | 243 | 60   | 1   | 0   | 139  | 121  | 4    | 24   | 7374  | 12101 | 12101 | 1874  | 478  | 0.1760627 |           |  |  |
| 452 | 2        | 87  | 1115  | 5325  | 2     | 111   | 7013  | 7679  | 3     | 211   | 111  | 54  | 243 | 60   | 1   | 0   | 139  | 121  | 4    | 24   | 7374  | 12101 | 12101 | 1874  | 478  | 0.1760627 |           |  |  |
| 254 | 673      | 847   | 1618  | 3234  | 284   | 445   | 4208  | 6402  | 1143  | 2860  | 1002 | 226 | 754 | 1281 | 563 | 339 | 986  | 2400 | 406  | 1153 | 4791  | 5404  | 1851  | 1864  | 13   | 0.221558  |           |  |  |
| 432 | 2        | 92  | 1163  | 5217  | 2     | 94    | 6888  | 7695  | 3     | 207   | 98   | 62  | 228 | 68   | 3   | 4   | 139  | 103  | 9    | 15   | 7358  | 12065 | 12065 | 1861  | 1864 | 0.221558  |           |  |  |
| 453 | 2        | 92  | 1163  | 5217  | 2     | 94    | 6888  | 7695  | 3     | 207   | 98   | 62  | 228 | 68   | 3   | 4   | 139  | 103  | 9    | 15   | 7358  | 12065 | 12065 | 1861  | 1864 | 0.221558  |           |  |  |
| 125 | 3        | 36  | 839   | 5624  | 1     | 21    | 6480  | 7983  | 3     | 21    | 2    | 2   | 3   | 4    | 1   | 0   | 30   | 23   | 0    | 5    | 5820  | 12170 | 951   | 1721  | 391  | 0.2871988 |           |  |  |
| 273 | 500      | 657   | 1407  | 2558  | 224   | 500   | 3263  | 4756  | 869   | 2351  | 917  | 179 | 567 | 959  | 523 | 295 | 797  | 2045 | 394  | 879  | 3701  | 4240  | 1458  | 1406  | 304  | 0.3058614 |           |  |  |
| 406 | 378      | 362   | 591   | 1298  | 303   | 602   | 2884  | 4113  | 703   | 2854  | 1243 | 255 | 538 | 486  | 539 | 491 | 1093 | 1083 | 315  | 1045 | 3220  | 3741  | 1887  | 1306  | 304  | 0.3058614 |           |  |  |
| 14  | 413      | 379   | 634   | 1230  | 293   | 634   | 2969  | 2949  | 644   | 2896  | 1213 | 217 | 561 | 484  | 511 | 492 | 1064 | 1040 | 346  | 982  | 3100  | 3834  | 1887  | 1293  | 826  | 0.3325019 |           |  |  |
| 14  | 413      | 379   | 634   | 1230  | 293   | 634   | 2969  | 2949  | 644   | 2896  | 1213 | 217 | 561 | 484  | 511 | 492 | 1064 | 1040 | 346  | 982  | 3100  | 3834  | 1887  | 1293  | 826  | 0.3325019 |           |  |  |
| 30  | 413      | 379   | 634   | 1230  | 293   | 634   | 2969  | 2949  | 644   | 2896  | 1213 | 217 | 561 | 484  | 511 | 492 | 1064 | 1040 | 346  | 982  | 3100  | 3834  | 1887  | 1293  | 826  | 0.3325019 |           |  |  |
| 560 | 378      | 362   | 591   | 1298  | 303   | 602   | 2884  | 4113  | 703   | 2854  | 1243 | 255 | 538 | 486  | 539 | 491 | 1093 | 1083 | 315  | 1045 | 3220  | 3741  | 1887  | 1293  | 826  | 0.3325019 |           |  |  |
| 446 | 2        | 1   | 999   | 3896  | 1     | 69    | 3900  | 7287  | 0     | 4     | 2    | 0   | 2   | 1    | 1   | 0   | 22   | 9    | 0    | 2    | 4497  | 6644  | 6644  | 1089  | 1295 | 0.13      |           |  |  |
| 437 | 189      | 201   | 836   | 2463  | 87    | 56    | 2962  | 4719  | 129   | 1214  | 500  | 205 | 589 | 88   | 104 | 18  | 440  | 917  | 14   | 71   | 2456  | 2493  | 2493  | 1022  | 949  | 0.2609    |           |  |  |
| 434 | 192      | 207   | 814   | 2479  | 85    | 55    | 3012  | 4719  | 129   | 1168  | 487  | 203 | 554 | 89   | 102 | 20  | 449  | 895  | 14   | 69   | 2530  | 2515  | 2515  | 1022  | 948  | 0.2609    |           |  |  |
| 455 | 59       | 54  | 732   | 2164  | 29    | 59    | 3386  | 4496  | 41    | 941   | 384  | 143 | 252 | 53   | 42  | 11  | 238  | 322  | 13   | 74   | 2572  | 3372  | 3372  | 1022  | 889  | 0.2609    |           |  |  |
| 458 | 59       | 61  | 709   | 2163  | 27    | 57    | 3349  | 4511  | 40    | 948   | 409  | 157 | 243 | 54   | 38  | 13  | 240  | 320  | 13   | 72   | 2508  | 3372  | 3372  | 1022  | 887  | 0.2609    |           |  |  |
| 87  | 1        | 172   | 639   | 1109  | 1     | 2     | 3743  | 35807 | 2     | 1156  | 504  | 2   | 1   | 1    | 1   | 1   | 2    | 557  | 1095 | 2    | 2     | 2549  | 3332  | 3332  | 1160 | 800       | 0.0450466 |  |  |
| 433 | 1        | 1   | 406   | 2415  | 2     | 7     | 3367  | 3976  | 2     | 1     | 2    | 1   | 2   | 1    | 2   | 1   | 61   | 2    | 2    | 2    | 2472  | 4923  | 403   | 784   | 8696 | 0.4036157 |           |  |  |
| 658 | 0        | 77  | 453   | 1480  | 2     | 39    | 2564  | 3184  | 11    | 67    | 3    | 16  | 0   | 6    | 2   | 1   | 46   | 27   | 3    | 187  | 1777  | 4660  | 771   | 695   | 3043 | 0.4806046 |           |  |  |
| 527 | 1        | 318   | 851   | 1492  | 1     | 0     | 2469  | 2331  | 0     | 1267  | 278  | 0   | 1   | 1    | 360 | 525 | 715  | 301  | 187  | 1327 | 2795  | 2795  | 658   | 682   | 1739 | 0.488806  |           |  |  |
| 514 | 3        | 90  | 387   | 1618  | 1     | 62    | 2912  | 3177  | 1     | 71    | 3    | 2   | 3   | 41   | 4   | 1   | 71   | 50   | 2    | 5    | 2574  | 4150  | 4150  | 678   | 676  | 7826      | 0.4971418 |  |  |
| 297 | 0        | 80  | 386   | 1558  | 2     | 48    | 2762  | 3050  | 2     | 80    | 0    | 1   | 0   | 0    | 0   | 3   | 66   | 57   | 1    | 2    | 1840  | 3539  | 3539  | 688   | 5455 | 0.503274  |           |  |  |
| 635 | 2        | 1   | 438   | 1990  | 2     | 12    | 3001  | 3514  | 2     | 26    | 64   | 29  | 132 | 2    | 6   | 5   | 62   | 38   | 1    | 0    | 1     | 4014  | 6792  | 337   | 646  | 087       | 0.513796  |  |  |
| 448 | 3        | 2   | 19    | 38    | 0     | 2     | 1     | 3527  | 116   | 0     | 2    | 1   | 2   | 0    | 2   | 1   | 1    | 0    | 0    | 0    | 1     | 1     | 1     | 1     | 1    | 1         | 0.520376  |  |  |
| 21  | 97       | 191   | 556   | 812   | 38    | 268   | 1730  | 2674  | 11    | 991   | 402  | 12  | 13  | 175  | 112 | 98  | 489  | 785  | 169  | 534  | 1592  | 1558  | 1558  | 748   | 611  | 087       | 0.520376  |  |  |
| 90  | 97       | 191   | 556   | 812   | 38    | 268   | 1730  | 2674  | 11    | 991   | 402  | 12  | 13  | 175  | 112 | 98  | 489  | 785  | 169  | 534  | 1592  | 1558  | 1558  | 748   | 611  | 087       | 0.520376  |  |  |
| 395 | 97       | 191   | 556   | 812   | 38    | 268   | 1730  | 2674  | 11    | 991   | 402  | 12  | 13  | 175  | 112 | 98  | 489  | 785  | 169  | 534  | 1592  | 1558  | 1558  | 748   | 611  | 087       | 0.520376  |  |  |
| 502 | 97       | 191   | 556   | 812   | 38    | 268   | 1730  | 2674  | 11    | 991   | 402  | 12  | 13  | 175  | 112 | 98  | 489  | 785  | 169  | 534  | 1592  | 1558  | 1558  | 748   | 611  | 087       | 0.520376  |  |  |
| 503 | 97       | 191   | 556   | 812   | 38    | 268   | 1730  | 2674  | 11    | 991   | 402  | 12  | 13  | 175  | 112 | 98  | 489  | 785  | 169  | 534  | 1592  | 1558  | 1558  | 748   | 611  | 087       | 0.520376  |  |  |
| 542 | 97       | 191   | 556   | 812   | 38    | 268   | 1730  | 2674  | 11    | 991   | 402  | 12  | 13  | 175  | 112 | 98  | 489  | 785  | 169  | 534  | 1592  | 1558  | 1558  | 748   | 611  | 087       | 0.520376  |  |  |
| 103 | 131      | 161   | 581   | 792   | 32    | 214   | 1845  | 2491  | 16    | 1018  | 410  | 7   | 12  | 168  | 139 | 122 | 483  | 730  | 174  | 486  | 1691  | 1519  | 654   | 603   | 3043 | 0.5657097 |           |  |  |
| 106 | 131      | 161   | 581   | 792   | 32    | 214   | 1845  | 2491  | 16    | 1018  | 410  | 7   | 12  | 168  | 139 | 122 | 483  | 730  | 174  | 486  | 1691  | 1519  | 654   | 603   | 3043 | 0.5657097 |           |  |  |
| 109 | 131      | 161   | 581   | 792   | 32    | 214   | 1845  | 2491  | 16    | 1018  | 410  | 7   | 12  | 168  | 139 | 122 | 483  | 730  | 174  | 486  | 1691  | 1519  | 654   | 603   | 3043 | 0.5657097 |           |  |  |
| 489 | 131      | 161   | 581   | 792   | 32    | 214   | 1845  | 2491  | 16    | 1018  | 410  | 7   | 12  | 168  | 139 | 122 | 483  | 730  | 174  | 486  | 1691  | 1519  | 654   | 603   | 3043 | 0.5657097 |           |  |  |
| 535 | 131      | 161   | 581   | 792   | 32    | 214   | 1845  | 2491  | 16    | 1018  | 410  | 7   | 12  | 168  | 139 | 122 | 483  | 730  | 174  | 486  | 1691  | 1519  | 654   | 603   | 3043 | 0.5657097 |           |  |  |
| 618 | 131      | 161   | 581   | 792   | 32    | 214   | 1845  | 2491  | 16    | 1018  | 410  | 7   | 12  | 168  | 139 | 122 | 483  | 730  | 174  | 486  | 1691  | 1519  | 654   | 603   | 3043 | 0.5657097 |           |  |  |
| 646 | 131      | 161   | 581   | 792   | 32    | 214   | 1845  | 2491  | 16    | 1018  | 410  | 7   | 12  | 168  | 139 | 122 | 483  | 730  | 174  | 486  | 1691  | 1519  | 654   | 603   | 3043 | 0.5657097 |           |  |  |
| 585 | 1        | 66  | 443   | 1242  | 2     | 59    | 2423  | 3796  | 11    | 83    | 13   | 11  | 1   | 5    | 7   | 1   | 27   | 32   | 0    | 2    | 1896  | 2878  | 2878  | 500   | 8636 | 0.609471  |           |  |  |
| 660 | 2        | 64  | 492   | 1193  | 1     | 35    | 2430  | 3789  | 13    | 77    | 23   | 27  | 2   | 5    | 7   | 1   | 27   | 32   | 0    | 2    | 1896  | 2878  | 2878  | 500   | 8636 | 0.609471  |           |  |  |
| 59  | 1        | 66  | 443   | 1242  | 2     | 59    | 2423  | 3796  | 11    | 83    | 13   | 11  | 1   | 5    | 7   | 1   | 27   | 32   | 0    | 2    | 1896  | 2878  | 2878  | 478   | 585  | 9565      | 0.6222558 |  |  |
| 118 | 1        | 66  | 443   | 1242  | 2     | 59    | 2423  | 3796  | 11    | 83    | 13   | 11  | 1   | 5    | 7   | 1   | 27   | 32   | 0    | 2    | 1896  | 2878  | 2878  | 478   | 585  | 9565      | 0.6222558 |  |  |
| 516 | 2        | 64  | 492   | 1193  | 1     | 35    | 2430  | 3789  | 13    | 77    | 23   | 27  | 2   | 5    | 7   | 1   | 27   | 32   | 0    | 2    | 1896  | 2878  | 2878  | 478   | 585  | 9565      | 0.6222558 |  |  |
| 294 | 3        | 71  | 520   | 958   | 4     | 41    | 2400  | 3559  | 6     | 120   | 32   | 27  | 4   | 3    | 11  | 3   | 36   | 48   | 2    | 5    | 1533  | 1914  | 1914  | 501   | 513  | 2609      | 0.6347553 |  |  |
| 307 | 3        | 71  | 520   | 958   | 4     | 41    | 2400  | 3559  | 6     | 120   | 32   | 27  | 4   | 3    | 11  | 3   | 36   | 48   | 2    | 5    | 1533  | 1914  | 1914  | 501   | 513  | 2609      | 0.6347553 |  |  |
| 300 | 4        | 73  | 497   | 958   | 3     | 59    | 2373  | 3457  | 7     | 102   | 31   | 17  | 4   | 4    | 2   | 4   | 32   | 53   | 3    | 2    | 1577  | 1918  | 1918  | 521   | 508  | 7391      | 0.6501921 |  |  |
| 308 | 4        | 73  | 497   | 958   | 3     | 59    | 2373  | 3457  | 7     | 102   | 31   | 17  | 4   | 4    | 2   | 4   | 32   | 53   | 3    | 2    | 1577  | 1918  | 1918  | 521   | 508  | 7391      | 0.6501921 |  |  |
| 511 | 4        | 73  | 497   | 958   | 3     | 59    | 2373  | 3457  | 7     | 102   | 31   | 17  | 4   | 4    | 2   | 4   | 32   | 53   | 3    | 2    | 1577  | 1918  | 1918  | 521   | 508  | 7391      | 0.6501921 |  |  |
| 101 | 4        | 6   | 431   | 919   | 34    | 128   | 2451  | 2710  | 5     | 4     | 5    | 4   | 9   | 7    | 4   | 1   | 131  | 99   | 3    | 2    | 1458  | 2441  | 2441  | 529   | 495  | 0.6860621 |           |  |  |
| 322 | 4        | 6   | 431   | 919   | 34    | 128   | 2451  | 2710  | 5     | 4     | 5    | 4   | 9   | 7    | 4   | 1   | 131  | 99   | 3    | 2    | 1458  | 2441  | 2441  | 529   | 495  | 0.68606   |           |  |  |

[illegible]

[illegible]

| MDR<br>PARAM ID | PARAMETER COUNT BY MDR CSV FILE ID (COLUMN HEADER IS FILE ID) |       |       |       |       |       |       |       |       |       |    |    |    |    |    |    |    |    |    |    |    |    |    |     | % OF ALL<br>MDR<br>COUNT |           |
|-----------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|--------------------------|-----------|
|                 | MSN#1   | MSN#2 | MSN#3 | MSN#4 | MSN#5 | MSN#6 | MSN#7 | MSN#8 | MSN#9 | MSN#0 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 0  | 1  | 2  | 3  | Avg |                          |           |
| 244             | 9   | 6     | 11    | 11    | 0     | 13    | 33    | 29    | 19    | 18    | 5  | 8  | 3  | 7  | 20 | 4  | 14 | 13 | 6  | 9  | 13 | 12 | 14 | 12  | 0.9861558                |           |
| 355             | 2   | 2     | 10    | 9     | 4     | 1     | 69    | 101   | 1     | 1     | 2  | 3  | 2  | 2  | 3  | 2  | 2  | 1  | 3  | 2  | 2  | 28 | 10 | 11  | 0.9862996                |           |
| 557             | 2   | 2     | 10    | 9     | 4     | 1     | 69    | 101   | 1     | 1     | 2  | 3  | 2  | 2  | 3  | 2  | 2  | 1  | 3  | 2  | 2  | 28 | 10 | 11  | 0.9864434                |           |
| 36              | 3   | 2     | 16    | 11    | 0     | 5     | 74    | 79    | 3     | 3     | 2  | 3  | 2  | 2  | 2  | 0  | 3  | 4  | 3  | 1  | 3  | 26 | 12 | 13  | 0.9865863                |           |
| 239             | 3   | 2     | 16    | 11    | 0     | 5     | 74    | 79    | 3     | 3     | 2  | 3  | 2  | 2  | 2  | 0  | 3  | 4  | 3  | 1  | 3  | 26 | 12 | 13  | 0.9867292                |           |
| 380             | 3   | 2     | 16    | 11    | 0     | 5     | 74    | 79    | 3     | 3     | 2  | 3  | 2  | 2  | 2  | 0  | 3  | 4  | 3  | 1  | 3  | 26 | 12 | 13  | 0.986872                 |           |
| 383             | 3   | 2     | 16    | 11    | 0     | 5     | 74    | 79    | 3     | 3     | 2  | 3  | 2  | 2  | 2  | 0  | 3  | 4  | 3  | 1  | 3  | 26 | 12 | 13  | 0.9870149                |           |
| 441             | 3   | 2     | 16    | 11    | 0     | 5     | 74    | 79    | 3     | 3     | 2  | 3  | 2  | 2  | 2  | 0  | 3  | 4  | 3  | 1  | 3  | 26 | 12 | 13  | 0.9871577                |           |
| 550             | 2   | 2     | 12    | 8     | 0     | 3     | 68    | 96    | 3     | 5     | 2  | 1  | 2  | 2  | 2  | 1  | 2  | 3  | 4  | 3  | 1  | 27 | 15 | 10  | 0.987555                 |           |
| 656             | 3   | 2     | 16    | 11    | 0     | 5     | 74    | 79    | 3     | 3     | 2  | 3  | 2  | 2  | 2  | 0  | 3  | 4  | 3  | 1  | 3  | 26 | 12 | 10  | 0.9877422                |           |
| 546             | 2   | 2     | 11    | 7     | 0     | 3     | 65    | 90    | 3     | 5     | 2  | 1  | 2  | 2  | 2  | 1  | 2  | 3  | 1  | 2  | 2  | 23 | 14 | 10  | 0.9878771                |           |
| 548             | 2   | 2     | 11    | 7     | 0     | 3     | 65    | 90    | 3     | 5     | 2  | 1  | 2  | 2  | 2  | 1  | 2  | 3  | 1  | 2  | 2  | 23 | 14 | 10  | 0.9879712                |           |
| 549             | 2   | 2     | 10    | 9     | 4     | 1     | 66    | 88    | 1     | 1     | 2  | 3  | 2  | 2  | 2  | 3  | 2  | 1  | 3  | 2  | 2  | 26 | 10 | 8   | 0.9879448                |           |
| 551             | 2   | 2     | 10    | 9     | 4     | 1     | 66    | 88    | 1     | 1     | 2  | 3  | 2  | 2  | 2  | 3  | 2  | 1  | 3  | 2  | 2  | 26 | 10 | 8   | 0.9879776                |           |
| 547             | 2   | 2     | 10    | 9     | 4     | 1     | 66    | 88    | 1     | 1     | 2  | 3  | 2  | 2  | 2  | 3  | 2  | 1  | 3  | 2  | 2  | 26 | 10 | 8   | 0.9881036                |           |
| 265             | 6   | 5     | 7     | 10    | 1     | 6     | 12    | 21    | 25    | 20    | 8  | 9  | 7  | 9  | 14 | 8  | 7  | 14 | 2  | 10 | 8  | 9  | 13 | 10  | 0.9882258                |           |
| 267             | 11  | 5     | 6     | 13    | 8     | 4     | 20    | 20    | 8     | 18    | 7  | 6  | 8  | 10 | 8  | 8  | 10 | 12 | 5  | 8  | 11 | 16 | 9  | 12  | 0.988348                 |           |
| 285             | 8   | 11    | 7     | 10    | 8     | 9     | 10    | 12    | 14    | 11    | 8  | 9  | 11 | 7  | 10 | 13 | 11 | 8  | 12 | 9  | 12 | 7  | 12 | 9   | 0.9884692                |           |
| 574             | 8   | 10    | 14    | 7     | 5     | 7     | 11    | 9     | 12    | 16    | 3  | 3  | 6  | 12 | 8  | 8  | 9  | 13 | 8  | 10 | 14 | 23 | 7  | 9   | 0.9885866                |           |
| 284             | 6   | 11    | 11    | 8     | 8     | 9     | 13    | 8     | 12    | 10    | 8  | 8  | 9  | 7  | 8  | 13 | 12 | 8  | 9  | 6  | 16 | 13 | 7  | 9   | 0.988705                 |           |
| 281             | 12  | 5     | 9     | 11    | 12    | 12    | 7     | 6     | 7     | 11    | 7  | 7  | 6  | 9  | 8  | 13 | 8  | 8  | 8  | 9  | 11 | 13 | 9  | 10  | 0.9888151                |           |
| 442             | 8   | 12    | 11    | 8     | 3     | 1     | 9     | 9     | 8     | 14    | 4  | 0  | 5  | 14 | 5  | 4  | 4  | 3  | 21 | 3  | 11 | 17 | 21 | 13  | 0.9889236                |           |
| 282             | 8   | 7     | 6     | 6     | 5     | 7     | 23    | 13    | 13    | 11    | 5  | 9  | 7  | 5  | 10 | 8  | 9  | 9  | 4  | 7  | 15 | 7  | 8  | 7   | 0.9890304                |           |
| 369             | 3   | 4     | 4     | 18    | 2     | 4     | 15    | 28    | 3     | 4     | 1  | 3  | 2  | 4  | 3  | 3  | 3  | 3  | 1  | 2  | 2  | 13 | 67 | 9   | 0.9891352                |           |
| 578             | 3   | 4     | 4     | 18    | 2     | 4     | 15    | 28    | 3     | 4     | 1  | 3  | 2  | 4  | 3  | 3  | 3  | 3  | 1  | 2  | 2  | 13 | 67 | 9   | 0.9892387                |           |
| 260             | 9   | 7     | 7     | 5     | 12    | 13    | 12    | 6     | 8     | 7     | 5  | 11 | 7  | 8  | 6  | 8  | 6  | 6  | 8  | 12 | 9  | 13 | 6  | 8   | 0.9893418                |           |
| 324             | 1   | 1     | 15    | 20    | 1     | 22    | 21    | 16    | 0     | 1     | 1  | 0  | 1  | 1  | 1  | 1  | 1  | 16 | 0  | 1  | 15 | 21 | 17 | 8   | 0.989444                 |           |
| 253             | 9   | 3     | 9     | 8     | 6     | 8     | 14    | 11    | 8     | 5     | 6  | 12 | 5  | 8  | 7  | 9  | 6  | 6  | 6  | 10 | 13 | 15 | 8  | 8   | 0.989455                 |           |
| 33              | 13  | 6     | 8     | 9     | 3     | 7     | 10    | 11    | 10    | 11    | 10 | 3  | 4  | 9  | 10 | 3  | 10 | 12 | 3  | 7  | 7  | 9  | 9  | 8   | 0.9896429                |           |
| 248             | 8   | 9     | 18    | 12    | 2     | 6     | 11    | 10    | 6     | 5     | 5  | 6  | 5  | 7  | 5  | 5  | 6  | 6  | 7  | 6  | 13 | 13 | 5  | 7   | 0.9897365                |           |
| 346             | 8   | 9     | 18    | 12    | 2     | 6     | 11    | 10    | 6     | 5     | 5  | 6  | 5  | 7  | 5  | 5  | 6  | 6  | 7  | 6  | 13 | 13 | 5  | 7   | 0.9898275                |           |
| 205             | 4   | 4     | 4     | 3     | 1     | 4     | 11    | 18    | 6     | 27    | 9  | 4  | 10 | 9  | 5  | 6  | 3  | 16 | 9  | 11 | 5  | 1  | 2  | 7   | 0.9899175                |           |
| 256             | 4   | 5     | 6     | 4     | 9     | 6     | 15    | 9     | 9     | 9     | 8  | 7  | 10 | 5  | 9  | 6  | 6  | 6  | 6  | 8  | 5  | 8  | 8  | 7   | 0.9899475                |           |
| 11              | 4   | 5     | 8     | 18    | 1     | 4     | 17    | 22    | 4     | 8     | 3  | 1  | 4  | 5  | 3  | 6  | 4  | 4  | 3  | 2  | 15 | 20 | 5  | 7   | 0.9900053                |           |
| 280             | 6   | 4     | 5     | 5     | 8     | 5     | 9     | 10    | 10    | 9     | 4  | 8  | 9  | 5  | 8  | 8  | 7  | 9  | 6  | 6  | 10 | 7  | 7  | 7   | 0.9900926                |           |
| 579             | 1   | 0     | 2     | 8     | 1     | 1     | 19    | 21    | 1     | 1     | 3  | 1  | 1  | 0  | 1  | 0  | 1  | 3  | 2  | 2  | 25 | 84 | 7  | 1   | 0.9901795                |           |
| 272             | 3   | 1     | 5     | 13    | 7     | 6     | 8     | 6     | 20    | 8     | 9  | 10 | 4  | 4  | 7  | 4  | 2  | 4  | 3  | 3  | 6  | 18 | 7  | 6   | 0.9902662                |           |
| 274             | 8   | 4     | 9     | 7     | 7     | 8     | 7     | 6     | 6     | 10    | 6  | 9  | 5  | 6  | 5  | 9  | 8  | 6  | 3  | 5  | 9  | 14 | 7  | 7   | 0.990353                 |           |
| 370             | 1   | 0     | 2     | 8     | 1     | 1     | 19    | 21    | 1     | 1     | 3  | 1  | 1  | 0  | 1  | 0  | 1  | 3  | 1  | 2  | 25 | 84 | 7  | 7   | 0.9904398                |           |
| 277             | 5   | 5     | 8     | 7     | 6     | 4     | 10    | 14    | 8     | 5     | 6  | 6  | 8  | 7  | 8  | 7  | 6  | 7  | 9  | 8  | 6  | 6  | 7  | 7   | 0.990528                 |           |
| 263             | 10  | 6     | 7     | 7     | 7     | 6     | 4     | 10    | 14    | 8     | 5  | 6  | 6  | 8  | 7  | 6  | 7  | 9  | 8  | 6  | 6  | 6  | 7  | 7   | 0.9906086                |           |
| 3               | 12  | 7     | 8     | 10    | 3     | 10    | 3     | 7     | 9     | 6     | 7  | 7  | 6  | 7  | 6  | 5  | 7  | 7  | 6  | 6  | 6  | 6  | 4  | 8   | 0.990771                 |           |
| 257             | 5   | 6     | 10    | 7     | 6     | 7     | 8     | 10    | 7     | 9     | 6  | 7  | 6  | 7  | 6  | 5  | 7  | 6  | 6  | 5  | 6  | 6  | 6  | 4   | 8                        | 0.9908509 |
| 259             | 4   | 5     | 8     | 7     | 6     | 7     | 9     | 6     | 7     | 7     | 5  | 9  | 6  | 7  | 6  | 5  | 7  | 6  | 6  | 6  | 6  | 6  | 4  | 8   | 0.9909281                |           |
| 304             | 3   | 5     | 6     | 6     | 3     | 2     | 26    | 38    | 3     | 3     | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3   | 0.9910054                |           |
| 487             | 2   | 3     | 9     | 11    | 2     | 5     | 10    | 9     | 8     | 6     | 3  | 5  | 3  | 6  | 3  | 5  | 1  | 2  | 4  | 3  | 12 | 9  | 13 | 6   | 0.9910821                |           |
| 10              | 4   | 6     | 6     | 13    | 3     | 4     | 12    | 14    | 5     | 9     | 2  | 2  | 4  | 5  | 6  | 5  | 6  | 5  | 3  | 9  | 8  | 9  | 8  | 11  | 0.9911568                |           |
| 23              | 4   | 6     | 6     | 13    | 3     | 4     | 12    | 14    | 5     | 9     | 2  | 2  | 4  | 5  | 6  | 5  | 6  | 5  | 3  | 9  | 8  | 9  | 8  | 11  | 0.9912355                |           |
| 317             | 1   | 1     | 11    | 14    | 1     | 5     | 28    | 15    | 2     | 2     | 1  | 2  | 1  | 1  | 2  | 2  | 2  | 8  | 8  | 2  | 1  | 11 | 21 | 5   | 0.991322                 |           |
| 392             | 4   | 6     | 6     | 13    | 3     | 4     | 12    | 14    | 5     | 9     | 2  | 2  | 4  | 5  | 6  | 5  | 6  | 5  | 3  | 9  | 8  | 9  | 8  | 11  | 0.9913866                |           |
| 657             | 3   | 5     | 6     | 6     | 3     | 2     | 26    | 38    | 3     | 3     | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3  | 3   | 0.9914632                |           |
| 251             | 5   | 5     | 4     | 4     | 9     | 5     | 5     | 4     | 15    | 5     | 9  | 5  | 6  | 5  | 11 | 2  | 2  | 4  | 2  | 4  | 3  | 3  | 6  | 7   | 0.9915372                |           |
| 4               | 3   | 5     | 4     | 6     | 3     | 5     | 10    | 6     | 4     | 11    | 8  | 8  | 3  | 6  | 11 | 3  | 6  | 8  | 3  | 5  | 9  | 7  | 5  | 8   | 0.9916108                |           |
| 2               | 4   | 5     | 4     | 6     | 3     | 5     | 10    | 6     | 4     | 11    | 8  | 8  | 3  | 6  | 11 | 3  | 6  | 8  | 3  | 5  | 9  | 7  | 5  | 8   | 0.9917552                |           |
| 148             | 1   | 1     | 2     | 2     | 3     | 1     | 10    | 13    | 7     | 27    | 12 | 1  | 5  | 6  | 2  | 5  | 4  | 2  | 4  | 3  | 11 | 6  | 6  | 5   | 0.9918267                |           |
| 405             | 3   | 3     | 8     | 4     | 3     | 6     | 26    | 20    | 3     | 5     | 3  | 3  | 2  | 3  | 2  | 5  | 4  | 2  | 4  | 3  | 11 | 6  | 6  | 5   | 0.9919674                |           |
| 494             | 3   | 3     | 8     | 4     | 3     | 6     | 26    | 20    | 3     | 5     | 3  | 3  | 2  | 3  | 2  | 5  | 4  | 2  | 4  | 3  | 11 | 6  | 6  | 5   | 0.9920378                |           |
| 34              | 4   | 5     | 13    | 5     | 4     | 2     | 7     | 7     | 7     | 7     | 12 | 6  | 5  | 8  | 9  | 3  | 4  | 4  | 3  | 5  | 7  | 4  | 6  | 5   | 0.992081                 |           |
| 119             | 4   | 5     | 13    | 5     | 4     | 2     | 7     | 7     | 7     | 7     | 12 | 6  | 5  | 8  | 9  | 3  | 4  | 4  | 3  | 5  | 7  | 4  | 6  | 5   | 0.9921784                |           |
| 354             | 4   | 5     | 13    | 5     | 4     | 2     | 7     | 7     | 7     | 7     | 12 | 6  | 5  | 8  | 9  | 3  | 4  | 4  | 3  | 5  | 7  | 4  | 6  | 5   | 0.9922482                |           |
| 397             | 4   | 5     | 13    | 5     | 4     | 2     | 7     | 7     | 7     | 7     | 12 | 6  | 5  | 8  | 9  | 3  | 4  | 4  | 3  | 5  | 7  | 4  | 6  | 5   | 0.992317                 |           |
| 619             | 4   | 5     | 13    | 5     | 4     | 2     | 7     | 7     | 7     | 7     | 12 | 6  | 5  | 8  | 9  | 3  | 4  | 4  | 3  | 5  | 7  |    |    |     |                          |           |

[illegible]

| MDR<br>PARAM ID | PARAMETER COUNT BY MDR CSV FILE ID (COLUMN HEADERS IS FILE ID) |       |       |       |       |       |       |       |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | % OF ALL<br>MDR |           |           |           |
|-----------------|--|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------|-----------|-----------|-----------|
|                 | MSNR1  | MSNR2 | MSNR3 | MSNR4 | MSNR5 | MSNR6 | MSNR7 | MSNR8 | MSNR9 | MSNR10 | MSNR11 | MSNR12 | MSNR13 | MSNR14 | MSNR15 | MSNR16 | MSNR17 | MSNR18 | MSNR19 | MSNR20 | MSNR21 | MSNR22 | MSNR23 | MSNR24 | MSNR25 | MSNR26 | MSNR27 |                 |           |           |           |
| 467             | 1  | 2     | 5     | 6     | 2     | 5     | 4     | 1     | 2     | 1      | 2      | 2      | 2      | 4      | 4      | 3      | 1      | 5      | 7      | 6      | 3      | 3      | 4      | 7      | 6      | 3      | 3      | 4               | 0.9959381 |           |           |
| 534             | 3  | 3     | 4     | 6     | 1     | 5     | 4     | 4     | 3     | 3      | 4      | 2      | 4      | 2      | 3      | 4      | 4      | 4      | 1      | 2      | 3      | 3      | 4      | 4      | 1      | 2      | 3      | 3               | 4         | 0.9959788 |           |
| 461             | 1  | 6     | 4     | 5     | 2     | 5     | 4     | 2     | 5     | 2      | 1      | 1      | 1      | 3      | 5      | 3      | 2      | 2      | 5      | 4      | 8      | 3      | 2      | 5      | 4      | 8      | 3      | 2               | 6         | 0.9960185 |           |
| 311             | 1  | 5     | 3     | 3     | 3     | 6     | 4     | 2     | 3     | 6      | 3      | 5      | 2      | 4      | 2      | 1      | 1      | 3      | 2      | 2      | 6      | 3      | 2      | 5      | 4      | 3      | 2      | 6               | 3         | 0.9960582 |           |
| 247             | 2  | 2     | 3     | 4     | 3     | 2     | 7     | 1     | 0     | 4      | 9      | 1      | 2      | 3      | 2      | 3      | 2      | 2      | 1      | 2      | 6      | 3      | 2      | 5      | 4      | 2      | 6      | 3               | 3         | 0.9960973 |           |
| 149             | 2  | 2     | 1     | 6     | 1     | 1     | 4     | 4     | 4     | 4      | 3      | 3      | 4      | 1      | 2      | 3      | 5      | 3      | 2      | 4      | 3      | 5      | 3      | 5      | 3      | 5      | 3      | 0               | 4         | 0.9961359 |           |
| 150             | 2  | 2     | 1     | 6     | 1     | 1     | 4     | 3     | 4     | 4      | 3      | 3      | 4      | 1      | 2      | 3      | 5      | 3      | 2      | 4      | 3      | 5      | 3      | 4      | 3      | 5      | 3      | 0               | 4         | 0.996173  |           |
| 155             | 2  | 2     | 1     | 6     | 1     | 1     | 4     | 3     | 4     | 4      | 3      | 3      | 4      | 1      | 2      | 3      | 5      | 3      | 2      | 4      | 3      | 5      | 3      | 4      | 3      | 5      | 3      | 0               | 4         | 0.99621   |           |
| 206             | 2  | 2     | 1     | 6     | 1     | 1     | 4     | 3     | 4     | 4      | 4      | 3      | 4      | 1      | 2      | 3      | 5      | 3      | 2      | 4      | 3      | 5      | 3      | 4      | 3      | 5      | 3      | 0               | 4         | 0.9962471 |           |
| 207             | 2  | 2     | 1     | 6     | 1     | 1     | 4     | 3     | 4     | 4      | 4      | 3      | 4      | 1      | 2      | 3      | 5      | 3      | 2      | 4      | 3      | 5      | 3      | 4      | 3      | 5      | 3      | 0               | 4         | 0.9963211 |           |
| 212             | 2  | 2     | 1     | 6     | 1     | 1     | 4     | 3     | 4     | 4      | 4      | 3      | 4      | 1      | 2      | 3      | 5      | 3      | 2      | 4      | 3      | 5      | 3      | 4      | 3      | 5      | 3      | 0               | 4         | 0.9963582 |           |
| 213             | 2  | 2     | 1     | 6     | 1     | 1     | 4     | 3     | 4     | 4      | 4      | 3      | 4      | 1      | 2      | 3      | 5      | 3      | 2      | 4      | 3      | 5      | 3      | 4      | 3      | 5      | 3      | 0               | 4         | 0.9963952 |           |
| 240             | 2  | 4     | 3     | 3     | 1     | 2     | 3     | 4     | 4     | 5      | 3      | 4      | 3      | 1      | 4      | 2      | 4      | 3      | 2      | 1      | 4      | 2      | 5      | 4      | 3      | 5      | 3      | 0               | 4         | 0.9964322 |           |
| 241             | 2  | 4     | 3     | 3     | 1     | 2     | 3     | 4     | 4     | 5      | 3      | 4      | 3      | 1      | 4      | 2      | 4      | 3      | 2      | 1      | 4      | 2      | 5      | 4      | 3      | 5      | 3      | 0               | 4         | 0.9964682 |           |
| 334             | 1  | 2     | 3     | 3     | 2     | 0     | 4     | 9     | 4     | 1      | 3      | 2      | 2      | 2      | 2      | 19     | 4      | 1      | 3      | 1      | 2      | 2      | 2      | 2      | 2      | 2      | 2      | 1               | 4         | 0.9965042 |           |
| 334             | 0  | 7     | 5     | 0     | 4     | 9     | 4     | 1     | 3     | 2      | 0      | 1      | 1      | 1      | 1      | 0      | 1      | 7      | 5      | 1      | 0      | 7      | 5      | 1      | 0      | 7      | 5      | 6               | 2         | 0.9965396 |           |
| 261             | 4  | 2     | 1     | 6     | 1     | 1     | 7     | 5     | 3     | 3      | 1      | 1      | 2      | 3      | 2      | 1      | 1      | 3      | 2      | 1      | 1      | 3      | 1      | 2      | 0      | 4      | 4      | 3               | 2         | 0.9965746 |           |
| 89              | 5  | 3     | 1     | 3     | 1     | 1     | 7     | 5     | 3     | 1      | 1      | 1      | 2      | 3      | 2      | 1      | 1      | 3      | 1      | 2      | 0      | 4      | 4      | 2      | 0      | 4      | 4      | 2               | 5         | 1         | 0.9966074 |
| 181             | 5  | 3     | 1     | 3     | 1     | 1     | 7     | 5     | 3     | 1      | 1      | 1      | 2      | 3      | 2      | 1      | 1      | 3      | 1      | 2      | 0      | 4      | 4      | 2      | 0      | 4      | 4      | 2               | 5         | 1         | 0.996638  |
| 389             | 5  | 3     | 1     | 3     | 1     | 1     | 7     | 5     | 3     | 1      | 1      | 1      | 2      | 3      | 2      | 1      | 1      | 3      | 1      | 2      | 0      | 4      | 4      | 2      | 0      | 4      | 4      | 2               | 5         | 1         | 0.9966687 |
| 416             | 5  | 3     | 1     | 3     | 1     | 1     | 7     | 5     | 3     | 1      | 1      | 1      | 2      | 3      | 2      | 1      | 1      | 3      | 1      | 2      | 0      | 4      | 4      | 2      | 0      | 4      | 4      | 2               | 5         | 1         | 0.9966994 |
| 607             | 5  | 3     | 1     | 3     | 1     | 1     | 7     | 5     | 3     | 1      | 1      | 1      | 2      | 3      | 2      | 1      | 1      | 3      | 1      | 2      | 0      | 4      | 4      | 2      | 0      | 4      | 4      | 2               | 5         | 1         | 0.9967301 |
| 652             | 5  | 3     | 1     | 3     | 1     | 1     | 7     | 5     | 3     | 1      | 1      | 1      | 2      | 3      | 2      | 1      | 1      | 3      | 1      | 2      | 0      | 4      | 4      | 2      | 0      | 4      | 4      | 2               | 5         | 1         | 0.9967678 |
| 75              | 2  | 5     | 3     | 2     | 1     | 2     | 3     | 5     | 1     | 3      | 1      | 1      | 2      | 2      | 2      | 5      | 1      | 1      | 3      | 1      | 2      | 0      | 4      | 4      | 2      | 4      | 4      | 2               | 5         | 4         | 0.9967899 |
| 543             | 2  | 5     | 3     | 2     | 1     | 2     | 3     | 5     | 1     | 3      | 1      | 1      | 2      | 2      | 2      | 5      | 1      | 1      | 3      | 1      | 2      | 0      | 4      | 4      | 2      | 4      | 4      | 2               | 5         | 4         | 0.9968195 |
| 576             | 1  | 1     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 4      | 1      | 1      | 4      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9968491 |           |
| 621             | 1  | 1     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9968799 |           |
| 309             | 1  | 1     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9969195 |           |
| 311             | 1  | 1     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9969491 |           |
| 340             | 1  | 1     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9969779 |           |
| 378             | 1  | 1     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9970066 |           |
| 398             | 1  | 1     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9970352 |           |
| 442             | 1  | 1     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9970623 |           |
| 482             | 1  | 1     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9970909 |           |
| 100             | 2  | 2     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9970781 |           |
| 400             | 2  | 2     | 4     | 1     | 1     | 2     | 6     | 2     | 1     | 3      | 0      | 2      | 2      | 2      | 2      | 0      | 2      | 2      | 14     | 0      | 1      | 2      | 3      | 5      | 2      | 4      | 3      | 5               | 2         | 0.9971066 |           |
| 98              | 1  | 0     | 0     | 3     | 2     | 2     | 6     | 2     | 2     | 3      | 3      | 2      | 2      | 3      | 3      | 2      | 1      | 1      | 3      | 3      | 2      | 3      | 2      | 3      | 1      | 2      | 3      | 0               | 4         | 2         | 0.9971347 |
| 368             | 1  | 0     | 0     | 3     | 2     | 2     | 6     | 2     | 2     | 3      | 3      | 2      | 2      | 3      | 3      | 2      | 1      | 1      | 3      | 3      | 2      | 3      | 2      | 3      | 1      | 2      | 3      | 0               | 4         | 2         | 0.9971627 |
| 531             | 1  | 0     | 0     | 3     | 2     | 2     | 6     | 2     | 2     | 3      | 3      | 2      | 2      | 3      | 3      | 2      | 1      | 1      | 3      | 3      | 2      | 3      | 2      | 3      | 1      | 2      | 3      | 0               | 4         | 2         | 0.9971902 |
| 278             | 1  | 3     | 5     | 2     | 1     | 3     | 3     | 2     | 2     | 6      | 2      | 3      | 3      | 2      | 2      | 2      | 2      | 2      | 2      | 2      | 2      | 3      | 5      | 2      | 1      | 2      | 6      | 0               | 7         | 2         | 0.9972177 |
| 371             | 2  | 1     | 2     | 3     | 1     | 3     | 3     | 2     | 2     | 6      | 2      | 3      | 3      | 2      | 2      | 2      | 2      | 2      | 2      | 2      | 2      | 3      | 5      | 2      | 1      | 2      | 6      | 0               | 7         | 2         | 0.9972453 |
| 373             | 2  | 1     | 2     | 3     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9972717 |
| 375             | 2  | 1     | 2     | 3     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9972982 |
| 466             | 2  | 1     | 2     | 3     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9973246 |
| 44              | 1  | 2     | 4     | 1     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9973511 |
| 77              | 1  | 2     | 4     | 1     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9973775 |
| 79              | 1  | 2     | 4     | 1     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9974034 |
| 419             | 1  | 2     | 4     | 1     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9974294 |
| 719             | 1  | 2     | 4     | 1     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9974553 |
| 49              | 1  | 2     | 4     | 1     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9974812 |
| 523             | 1  | 2     | 4     | 1     | 1     | 2     | 4     | 5     | 0     | 1      | 2      | 1      | 2      | 1      | 1      | 1      | 1      | 3      | 3      | 0      | 2      | 4      | 6      | 3      | 2      | 1      | 7      | 3               | 1         | 3         | 0.9975072 |
| 183             | 2  | 1     | 2     | 2     |       |       |       |       |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |                 |           |           |           |





| MOR<br>PARAM ID | PARAMETER COUNT BY MOR CSV FILE ID (COLUMN HEADER IS FILE ID) |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         | COUNT | % OF ALL<br>MOR |
|-----------------|---|-------|-------|-------|-------|-------|-------|-------|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------|-------|-----------------|
|                 | MSNF1   | MSNR2 | MSNR3 | MSNR4 | MSNR5 | MSNR6 | MSNR7 | MSNR8 | MSNR9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 |         |       |                 |
| 360             | 1   | 1     | 2     | 1     | 2     | 1     | 1     | 2     | 1     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 403             | 1   | 2     | 1     | 2     | 1     | 1     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 415             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 418             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 422             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 431             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 483             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 501             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 506             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 508             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 510             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 537             | 1   | 1     | 2     | 1     | 1     | 2     | 1     | 1     | 2     | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1391304 |       |                 |
| 407             | 0   | 2     | 2     | 1     | 2     | 2     | 0     | 1     | 3     | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 0 | 2 | 0 | 2 | 0 | 1 | 1304348 |       |                 |
| 409             | 0   | 2     | 2     | 1     | 1     | 2     | 2     | 0     | 1     | 3 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 0 | 2 | 0 | 2 | 0 | 1 | 1304348 |       |                 |
| 410             | 0   | 2     | 1     | 1     | 2     | 2     | 0     | 1     | 3     | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 0 | 2 | 0 | 2 | 0 | 1 | 1304348 |       |                 |
| 160             | 2   | 1     | 1     | 1     | 2     | 1     | 1     | 0     | 1     | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0993448 |       |                 |
| 82              | 2   | 1     | 1     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 126087  |       |                 |
| 211             | 1   | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 121391  |       |                 |
| 201             | 1   | 1     | 1     | 0     | 1     | 1     | 1     | 1     | 1     | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 099375  |       |                 |
| 15              | 0   | 0     | 1     | 0     | 0     | 1     | 0     | 1     | 2     | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 095622  |       |                 |
| 51              | 0   | 0     | 1     | 0     | 0     | 1     | 0     | 0     | 1     | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0993668 |       |                 |
| 64              | 0   | 0     | 1     | 0     | 0     | 1     | 0     | 0     | 1     | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0994062 |       |                 |
| 427             | 0   | 0     | 1     | 0     | 0     | 1     | 0     | 0     | 1     | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0994157 |       |                 |
| 479             | 0   | 0     | 1     | 0     | 0     | 1     | 0     | 0     | 1     | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0994347 |       |                 |
| 479             | 0   | 0     | 1     | 0     | 0     | 1     | 0     | 0     | 1     | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0994443 |       |                 |
| 517             | 0   | 1     | 0     | 1     | 0     | 0     | 1     | 0     | 1     | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 1 | 1 | 0994538 |       |                 |
| 53              | 1   | 1     | 0     | 1     | 0     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0994617 |       |                 |
| 91              | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0994697 |       |                 |
| 95              | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0994776 |       |                 |
| 109             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0994855 |       |                 |
| 112             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0994855 |       |                 |
| 114             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0994855 |       |                 |
| 116             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0994855 |       |                 |
| 126             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995014 |       |                 |
| 142             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995014 |       |                 |
| 199             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995093 |       |                 |
| 242             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995173 |       |                 |
| 280             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995252 |       |                 |
| 292             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995332 |       |                 |
| 337             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995411 |       |                 |
| 347             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995411 |       |                 |
| 359             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 099557  |       |                 |
| 402             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995449 |       |                 |
| 414             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995728 |       |                 |
| 417             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995728 |       |                 |
| 421             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 432             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 500             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 505             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 507             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 509             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 536             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 558             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 561             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 563             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 567             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 590             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 596             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 595             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 597             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 609             | 1   | 1     | 0     | 1     | 1     | 1     | 1     | 0     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 612             | 0   | 0     | 1     | 0     | 0     | 1     | 0     | 0     | 1     | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0995808 |       |                 |
| 625             | 0   | 0     | 1     | 0     | 0     | 1     | 0     | 0     | 1     | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0995808 |       |                 |
| 630             | 1   | 1     | 0     | 1     | 1     | 0     | 0     | 1     | 1     | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0995808 |       |                 |
| 632             | 1   | 1     | 0     | 1     | 1     | 0     | 1     | 1     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 637             | 1   | 1     | 0     | 1     | 1     | 0     | 1     | 1     | 1     | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0995808 |       |                 |
| 639             | 1   | 1     | 0     | 1     | 1     | 0     | 1     | 1     | 1     | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 1 | 0995808 |       |                 |

| MDR<br>PARAM ID | PARAMETER COUNT BY MDR CSV FILE ID (COLUMN HEADER IS FILE ID) |       |       |       |       |       |       |       |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | COUNT  |        |        | % OF ALL<br>MDR |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
|-----------------|---|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                 | MSNF1   | MSNF2 | MSNF3 | MSNF4 | MSNF5 | MSNF6 | MSNF7 | MSNF8 | MSNF9 | MSNF10 | MSNF11 | MSNF12 | MSNF13 | MSNF14 | MSNF15 | MSNF16 | MSNF17 | MSNF18 | MSNF19 | MSNF20 | MSNF21 | MSNF22 | MSNF23 | MSNF24 | MSNF25 | MSNF26 | MSNF27 | MSNF28 | MSNF29 | MSNF30 | MSNF31 | MSNF32 | MSNF33 | MSNF34 | MSNF35 |                 | MSNF36 | MSNF37 | MSNF38 | MSNF39 | MSNF40 | MSNF41 | MSNF42 | MSNF43 | MSNF44 | MSNF45 | MSNF46 | MSNF47 | MSNF48 | MSNF49 | MSNF50 | MSNF51 | MSNF52 | MSNF53 | MSNF54 | MSNF55 | MSNF56 | MSNF57 | MSNF58 | MSNF59 | MSNF60 | MSNF61 | MSNF62 | MSNF63 | MSNF64 | MSNF65 | MSNF66 | MSNF67 | MSNF68 | MSNF69 | MSNF70 | MSNF71 | MSNF72 | MSNF73 | MSNF74 | MSNF75 | MSNF76 | MSNF77 | MSNF78 | MSNF79 | MSNF80 | MSNF81 | MSNF82 | MSNF83 | MSNF84 | MSNF85 | MSNF86 | MSNF87 | MSNF88 | MSNF89 | MSNF90 | MSNF91 | MSNF92 | MSNF93 | MSNF94 | MSNF95 | MSNF96 | MSNF97 | MSNF98 | MSNF99 | MSNF100 | MSNF101 | MSNF102 | MSNF103 | MSNF104 | MSNF105 | MSNF106 | MSNF107 | MSNF108 | MSNF109 | MSNF110 | MSNF111 | MSNF112 | MSNF113 | MSNF114 | MSNF115 | MSNF116 | MSNF117 | MSNF118 | MSNF119 | MSNF120 | MSNF121 | MSNF122 | MSNF123 | MSNF124 | MSNF125 | MSNF126 | MSNF127 | MSNF128 | MSNF129 | MSNF130 | MSNF131 | MSNF132 | MSNF133 | MSNF134 | MSNF135 | MSNF136 | MSNF137 | MSNF138 | MSNF139 | MSNF140 | MSNF141 | MSNF142 | MSNF143 | MSNF144 | MSNF145 | MSNF146 | MSNF147 | MSNF148 | MSNF149 | MSNF150 | MSNF151 | MSNF152 | MSNF153 | MSNF154 | MSNF155 | MSNF156 | MSNF157 | MSNF158 | MSNF159 | MSNF160 | MSNF161 | MSNF162 | MSNF163 | MSNF164 | MSNF165 | MSNF166 | MSNF167 | MSNF168 | MSNF169 | MSNF170 | MSNF171 | MSNF172 | MSNF173 | MSNF174 | MSNF175 | MSNF176 | MSNF177 | MSNF178 | MSNF179 | MSNF180 | MSNF181 | MSNF182 | MSNF183 | MSNF184 | MSNF185 | MSNF186 | MSNF187 | MSNF188 | MSNF189 | MSNF190 | MSNF191 | MSNF192 | MSNF193 | MSNF194 | MSNF195 | MSNF196 | MSNF197 | MSNF198 | MSNF199 | MSNF200 | MSNF201 | MSNF202 | MSNF203 | MSNF204 | MSNF205 | MSNF206 | MSNF207 | MSNF208 | MSNF209 | MSNF210 | MSNF211 | MSNF212 | MSNF213 | MSNF214 | MSNF215 | MSNF216 | MSNF217 | MSNF218 | MSNF219 | MSNF220 | MSNF221 | MSNF222 | MSNF223 | MSNF224 | MSNF225 | MSNF226 | MSNF227 | MSNF228 | MSNF229 | MSNF230 | MSNF231 | MSNF232 | MSNF233 | MSNF234 | MSNF235 | MSNF236 | MSNF237 | MSNF238 | MSNF239 | MSNF240 | MSNF241 | MSNF242 | MSNF243 | MSNF244 | MSNF245 | MSNF246 | MSNF247 | MSNF248 | MSNF249 | MSNF250 | MSNF251 | MSNF252 | MSNF253 | MSNF254 | MSNF255 | MSNF256 | MSNF257 | MSNF258 | MSNF259 | MSNF260 | MSNF261 | MSNF262 | MSNF263 | MSNF264 | MSNF265 | MSNF266 | MSNF267 | MSNF268 | MSNF269 | MSNF270 | MSNF271 | MSNF272 | MSNF273 | MSNF274 | MSNF275 | MSNF276 | MSNF277 | MSNF278 | MSNF279 | MSNF280 | MSNF281 | MSNF282 | MSNF283 | MSNF284 | MSNF285 | MSNF286 | MSNF287 | MSNF288 | MSNF289 | MSNF290 | MSNF291 | MSNF292 | MSNF293 | MSNF294 | MSNF295 | MSNF296 | MSNF297 | MSNF298 | MSNF299 | MSNF300 | MSNF301 | MSNF302 | MSNF303 | MSNF304 | MSNF305 | MSNF306 | MSNF307 | MSNF308 | MSNF309 | MSNF310 | MSNF311 | MSNF312 | MSNF313 | MSNF314 | MSNF315 | MSNF316 | MSNF317 | MSNF318 | MSNF319 | MSNF320 | MSNF321 | MSNF322 | MSNF323 | MSNF324 | MSNF325 | MSNF326 | MSNF327 | MSNF328 | MSNF329 | MSNF330 | MSNF331 | MSNF332 | MSNF333 | MSNF334 | MSNF335 | MSNF336 | MSNF337 | MSNF338 | MSNF339 | MSNF340 | MSNF341 | MSNF342 | MSNF343 | MSNF344 | MSNF345 | MSNF346 | MSNF347 | MSNF348 | MSNF349 | MSNF350 | MSNF351 | MSNF352 | MSNF353 | MSNF354 | MSNF355 | MSNF356 | MSNF357 | MSNF358 | MSNF359 | MSNF360 | MSNF361 | MSNF362 | MSNF363 | MSNF364 | MSNF365 | MSNF366 | MSNF367 | MSNF368 | MSNF369 | MSNF370 | MSNF371 | MSNF372 | MSNF373 | MSNF374 | MSNF375 | MSNF376 | MSNF377 | MSNF378 | MSNF379 | MSNF380 | MSNF381 | MSNF382 | MSNF383 | MSNF384 | MSNF385 | MSNF386 | MSNF387 | MSNF388 | MSNF389 | MSNF390 | MSNF391 | MSNF392 | MSNF393 | MSNF394 | MSNF395 | MSNF396 | MSNF397 | MSNF398 | MSNF399 | MSNF400 | MSNF401 | MSNF402 | MSNF403 | MSNF404 | MSNF405 | MSNF406 | MSNF407 | MSNF408 | MSNF409 | MSNF410 | MSNF411 | MSNF412 | MSNF413 | MSNF414 | MSNF415 | MSNF416 | MSNF417 | MSNF418 | MSNF419 | MSNF420 | MSNF421 | MSNF422 | MSNF423 | MSNF424 | MSNF425 | MSNF426 | MSNF427 | MSNF428 | MSNF429 | MSNF430 | MSNF431 | MSNF432 | MSNF433 | MSNF434 | MSNF435 | MSNF436 | MSNF437 | MSNF438 | MSNF439 | MSNF440 | MSNF441 | MSNF442 | MSNF443 | MSNF444 | MSNF445 | MSNF446 | MSNF447 | MSNF448 | MSNF449 | MSNF450 | MSNF451 | MSNF452 | MSNF453 | MSNF454 | MSNF455 | MSNF456 | MSNF457 | MSNF458 | MSNF459 | MSNF460 | MSNF461 | MSNF462 | MSNF463 | MSNF464 | MSNF465 | MSNF466 | MSNF467 | MSNF468 | MSNF469 | MSNF470 | MSNF471 | MSNF472 | MSNF473 | MSNF474 | MSNF475 | MSNF476 | MSNF477 | MSNF478 | MSNF479 | MSNF480 | MSNF481 | MSNF482 | MSNF483 | MSNF484 | MSNF485 | MSNF486 | MSNF487 | MSNF488 | MSNF489 | MSNF490 | MSNF491 | MSNF492 | MSNF493 | MSNF494 | MSNF495 | MSNF496 | MSNF497 | MSNF498 | MSNF499 | MSNF500 | MSNF501 | MSNF502 | MSNF503 | MSNF504 | MSNF505 | MSNF506 | MSNF507 | MSNF508 | MSNF509 | MSNF510 | MSNF511 | MSNF512 | MSNF513 | MSNF514 | MSNF515 | MSNF516 | MSNF517 | MSNF518 | MSNF519 | MSNF520 | MSNF521 | MSNF522 | MSNF523 | MSNF524 | MSNF525 | MSNF526 | MSNF527 | MSNF528 | MSNF529 | MSNF530 | MSNF531 | MSNF532 | MSNF533 | MSNF534 | MSNF535 | MSNF536 | MSNF537 | MSNF538 | MSNF539 | MSNF540 | MSNF541 | MSNF542 | MSNF543 | MSNF544 | MSNF545 | MSNF546 | MSNF547 | MSNF548 | MSNF549 | MSNF550 | MSNF551 | MSNF552 | MSNF553 | MSNF554 | MSNF555 | MSNF556 | MSNF557 | MSNF558 | MSNF559 | MSNF560 | MSNF561 | MSNF562 | MSNF563 | MSNF564 | MSNF565 | MSNF566 | MSNF567 | MSNF568 | MSNF569 | MSNF570 | MSNF571 | MSNF572 | MSNF573 | MSNF574 | MSNF575 | MSNF576 | MSNF577 | MSNF578 | MSNF579 | MSNF580 | MSNF581 | MSNF582 | MSNF583 | MSNF584 | MSNF585 | MSNF586 | MSNF587 | MSNF588 | MSNF589 | MSNF590 | MSNF591 | MSNF592 | MSNF593 | MSNF594 | MSNF595 | MSNF596 | MSNF597 | MSNF598 | MSNF599 | MSNF600 | MSNF601 | MSNF602 | MSNF603 | MSNF604 | MSNF605 | MSNF606 | MSNF607 | MSNF608 | MSNF609 | MSNF610 | MSNF611 | MSNF612 | MSNF613 | MSNF614 | MSNF615 | MSNF616 | MSNF617 | MSNF618 | MSNF619 | MSNF620 | MSNF621 | MSNF622 | MSNF623 | MSNF624 | MSNF625 | MSNF626 | MSNF627 | MSNF628 | MSNF629 | MSNF630 | MSNF631 | MSNF632 | MSNF633 | MSNF634 | MSNF635 | MSNF636 | MSNF637 | MSNF638 | MSNF639 | MSNF640 | MSNF641 | MSNF642 | MSNF643 | MSNF644 | MSNF645 | MSNF646 | MSNF647 | MSNF648 | MSNF649 | MSNF650 | MSNF651 | MSNF652 | MSNF653 | MSNF654 | MSNF655 | MSNF656 | MSNF657 | MSNF658 | MSNF659 | MSNF660 | MSNF661 | MSNF662 | MSNF663 | MSNF664 | MSNF665 | MSNF666 | MSNF667 | MSNF668 | MSNF669 | MSNF670 | MSNF671 | MSNF672 | MSNF673 | MSNF674 | MSNF675 | MSNF676 | MSNF677 | MSNF678 | MSNF679 | MSNF680 | MSNF681 | MSNF682 | MSNF683 | MSNF684 | MSNF685 | MSNF686 | MSNF687 | MSNF688 | MSNF689 | MSNF690 | MSNF691 | MSNF692 | MSNF693 | MSNF694 | MSNF695 | MSNF696 | MSNF697 | MSNF698 | MSNF699 | MSNF700 | MSNF701 | MSNF702 | MSNF703 | MSNF704 | MSNF705 | MSNF706 | MSNF707 | MSNF708 | MSNF709 | MSNF710 | MSNF711 | MSNF712 | MSNF713 | MSNF714 | MSNF715 | MSNF716 | MSNF717 | MSNF718 | MSNF719 | MSNF720 | MSNF721 | MSNF722 | MSNF723 | MSNF724 | MSNF725 | MSNF726 | MSNF727 | MSNF728 | MSNF729 | MSNF730 | MSNF731 | MSNF732 | MSNF733 | MSNF734 | MSNF735 | MSNF736 | MSNF737 | MSNF738 | MSNF739 | MSNF740 | MSNF741 | MSNF742 | MSNF743 | MSNF744 | MSNF745 | MSNF746 | MSNF747 | MSNF748 | MSNF749 | MSNF750 | MSNF751 | MSNF752 | MSNF753 | MSNF754 | MSNF755 | MSNF756 | MSNF757 | MSNF758 | MSNF759 | MSNF760 | MSNF761 | MSNF762 | MSNF763 | MSNF764 | MSNF765 | MSNF766 | MSNF767 | MSNF768 | MSNF769 | MSNF770 | MSNF771 | MSNF772 | MSNF773 | MSNF774 | MSNF775 | MSNF776 | MSNF777 | MSNF778 | MSNF779 | MSNF780 | MSNF781 | MSNF782 | MSNF783 | MSNF784 | MSNF785 | MSNF786 | MSNF787 | MSNF788 | MSNF789 | MSNF790 | MSNF791 | MSNF792 | MSNF793 | MSNF794 | MSNF795 | MSNF796 | MSNF797 | MSNF798 | MSNF799 | MSNF800 | MSNF801 | MSNF802 | MSNF803 | MSNF804 | MSNF805 | MSNF806 | MSNF807 | MSNF808 | MSNF809 | MSNF810 | MSNF811 | MSNF812 | MSNF813 | MSNF814 | MSNF815 | MSNF816 | MSNF817 | MSNF818 | MSNF819 | MSNF820 | MSNF821 | MSNF822 | MSNF823 | MSNF824 | MSNF825 | MSNF826 | MSNF827 | MSNF828 | MSNF829 | MSNF830 | MSNF831 | MSNF832 | MSNF833 | MSNF834 | MSNF835 | MSNF836 | MSNF837 | MSNF838 | MSNF839 | MSNF840 | MSNF841 | MSNF842 | MSNF843 | MSNF844 | MSNF845 | MSNF846 | MSNF847 | MSNF848 | MSNF849 | MSNF850 | MSNF851 | MSNF852 | MSNF853 | MSNF854 | MSNF855 | MSNF856 | MSNF857 | MSNF858 | MSNF859 | MSNF860 | MSNF861 | MSNF862 | MSNF863 | MSNF864 | MSNF865 | MSNF866 | MSNF867 | MSNF868 | MSNF869 | MSNF870 | MSNF871 | MSNF872 | MSNF873 | MSNF874 | MSNF875 | MSNF876 | MSNF877 | MSNF878 | MSNF879 | MSNF880 | MSNF881 | MSNF882 | MSNF883 | MSNF884 | MSNF885 | MSNF886 | MSNF887 | MSNF888 | MSNF889 | MSNF890 | MSNF891 | MSNF892 | MSNF893 | MSNF894 | MSNF895 | MSNF896 | MSNF897 | MSNF898 | MSNF899 | MSNF900 | MSNF901 | MSNF902 | MSNF903 | MSNF904 | MSNF905 | MSNF906 | MSNF907 | MSNF908 | MSNF909 | MSNF910 | MSNF911 | MSNF912 | MSNF913 | MSNF914 | MSNF915 | MSNF916 | MSNF917 | MSNF918 | MSNF919 | MSNF920 | MSNF921 | MSNF922 | MSNF923 | MSNF924 | MSNF925 | MSNF926 | MSNF927 | MSNF928 | MSNF929 | MSNF930 | MSNF931 | MSNF932 | MSNF933 | MSNF934 | MSNF935 | MSNF936 | MSNF937 | MSNF938 | MSNF939 | MSNF940 | MSNF941 | MSNF942 | MSNF943 | MSNF944 | MSNF945 | MSNF946 | MSNF947 | MSNF948 | MSNF949 | MSNF950 | MSNF951 | MSNF952 | MSNF953 | MSNF954 | MSNF955 | MSNF956 | MSNF957 | MSNF958 | MSNF959 | MSNF960 | MSNF961 | MSNF962 | MSNF963 | MSNF964 | MSNF965 | MSNF966 | MSNF967 | MSNF968 | MSNF969 | MSNF970 | MSNF971 | MSNF972 | MSNF973 | MSNF974 | MSNF975 | MSNF976 | MSNF977 | MSNF978 | MSNF979 | MSNF980 | MSNF981 | MSNF982 | MSNF983 | MSNF984 | MSNF985 | MSNF986 | MSNF987 | MSNF988 | MSNF989 | MSNF990 | MSNF991 | MSNF992 | MSNF993 | MSNF994 | MSNF995 | MSNF996 | MSNF997 | MSNF998 |

## Appendix D - MDR Pareto Analysis

| MDR | PARAM ID | PARAMETER COUNT BY MDR CSV FILE ID (COLUMN HEADER IS FILE ID) |       |       |       |       |       |       |       |       |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        | AVG COUNT | % OF ALL MDR |
|-----|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------|--------------|
|     |          | MSNP0   | MSNP1 | MSNP2 | MSNP3 | MSNP4 | MSNP5 | MSNP6 | MSNP7 | MSNP8 | MSNP9 | MSNP10 | MSNP11 | MSNP12 | MSNP13 | MSNP14 | MSNP15 | MSNP16 | MSNP17 | MSNP18 | MSNP19 | MSNP20 | MSNP21 | MSNP22 | MSNP23 |           |              |
|     | 173      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 174      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 175      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 176      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 177      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 178      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 179      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 180      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 185      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 186      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 187      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 188      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 189      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 190      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 191      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 192      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 193      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 194      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 195      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 196      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 197      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 198      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 202      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 203      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 204      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 218      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 219      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 220      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 221      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 222      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 223      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 224      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 225      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 226      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 227      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 228      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 229      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 230      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 231      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 232      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 233      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 234      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 235      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 236      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 237      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 342      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 343      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 344      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 345      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 346      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 353      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 430      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 450      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 601      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 602      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 643      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 644      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 651      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |
|     | 654      | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1         |              |

| PARAMETER COUNT BY MDR CSV FILE ID (COLUMN HEADER IS FILE ID) |          |        |        |        |        |        |        |        |        |        |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |      |
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| MDR   | PARAM ID | MSNF#1 | MSNF#2 | MSNF#3 | MSNF#4 | MSNF#5 | MSNF#6 | MSNF#7 | MSNF#8 | MSNF#9 | MSNF#10 | MSNF#11 | MSNF#12 | MSNF#13 | MSNF#14 | MSNF#15 | MSNF#16 | MSNF#17 | MSNF#18 | MSNF#19 | MSNF#20 | MSNF#21 | MSNF#22 | MSNF#23 | MSNF#24 | MSNF#25 | MSNF#26 | MSNF#27 | MSNF#28 | MSNF#29 | MSNF#30 | MSNF#31 | MSNF#32 | MSNF#33 | MSNF#34 | MSNF#35 | MSNF#36 | MSNF#37 | MSNF#38 | MSNF#39 | MSNF#40 | MSNF#41 | MSNF#42 | MSNF#43 | MSNF#44 | MSNF#45 | MSNF#46 | MSNF#47 | MSNF#48 | MSNF#49 | MSNF#50 | MSNF#51 | MSNF#52 | MSNF#53 | MSNF#54 | MSNF#55 | MSNF#56 | MSNF#57 | MSNF#58 | MSNF#59 | MSNF#60 | MSNF#61 | MSNF#62 | MSNF#63 | MSNF#64 | MSNF#65 | MSNF#66 | MSNF#67 | MSNF#68 | MSNF#69 | MSNF#70 | MSNF#71 | MSNF#72 | MSNF#73 | MSNF#74 | MSNF#75 | MSNF#76 | MSNF#77 | MSNF#78 | MSNF#79 | MSNF#80 | MSNF#81 | MSNF#82 | MSNF#83 | MSNF#84 | MSNF#85 | MSNF#86 | MSNF#87 | MSNF#88 | MSNF#89 | MSNF#90 | MSNF#91 | MSNF#92 | MSNF#93 | MSNF#94 | MSNF#95 | MSNF#96 | MSNF#97 | MSNF#98 | MSNF#99 | MSNF#100 | MSNF#101 | MSNF#102 | MSNF#103 | MSNF#104 | MSNF#105 | MSNF#106 | MSNF#107 | MSNF#108 | MSNF#109 | MSNF#110 | MSNF#111 | MSNF#112 | MSNF#113 | MSNF#114 | MSNF#115 | MSNF#116 | MSNF#117 | MSNF#118 | MSNF#119 | MSNF#120 | MSNF#121 | MSNF#122 | MSNF#123 | MSNF#124 | MSNF#125 | MSNF#126 | MSNF#127 | MSNF#128 | MSNF#129 | MSNF#130 | MSNF#131 | MSNF#132 | MSNF#133 | MSNF#134 | MSNF#135 | MSNF#136 | MSNF#137 | MSNF#138 | MSNF#139 | MSNF#140 | MSNF#141 | MSNF#142 | MSNF#143 | MSNF#144 | MSNF#145 | MSNF#146 | MSNF#147 | MSNF#148 | MSNF#149 | MSNF#150 | MSNF#151 | MSNF#152 | MSNF#153 | MSNF#154 | MSNF#155 | MSNF#156 | MSNF#157 | MSNF#158 | MSNF#159 | MSNF#160 | MSNF#161 | MSNF#162 | MSNF#163 | MSNF#164 | MSNF#165 | MSNF#166 | MSNF#167 | MSNF#168 | MSNF#169 | MSNF#170 | MSNF#171 | MSNF#172 | MSNF#173 | MSNF#174 | MSNF#175 | MSNF#176 | MSNF#177 | MSNF#178 | MSNF#179 | MSNF#180 | MSNF#181 | MSNF#182 | MSNF#183 | MSNF#184 | MSNF#185 | MSNF#186 | MSNF#187 | MSNF#188 | MSNF#189 | MSNF#190 | MSNF#191 | MSNF#192 | MSNF#193 | MSNF#194 | MSNF#195 | MSNF#196 | MSNF#197 | MSNF#198 | MSNF#199 | MSNF#200 | MSNF#201 | MSNF#202 | MSNF#203 | MSNF#204 | MSNF#205 | MSNF#206 | MSNF#207 | MSNF#208 | MSNF#209 | MSNF#210 | MSNF#211 | MSNF#212 | MSNF#213 | MSNF#214 | MSNF#215 | MSNF#216 | MSNF#217 | MSNF#218 | MSNF#219 | MSNF#220 | MSNF#221 | MSNF#222 | MSNF#223 | MSNF#224 | MSNF#225 | MSNF#226 | MSNF#227 | MSNF#228 | MSNF#229 | MSNF#230 | MSNF#231 | MSNF#232 | MSNF#233 | MSNF#234 | MSNF#235 | MSNF#236 | MSNF#237 | MSNF#238 | MSNF#239 | MSNF#240 | MSNF#241 | MSNF#242 | MSNF#243 | MSNF#244 | MSNF#245 | MSNF#246 | MSNF#247 | MSNF#248 | MSNF#249 | MSNF#250 | MSNF#251 | MSNF#252 | MSNF#253 | MSNF#254 | MSNF#255 | MSNF#256 | MSNF#257 | MSNF#258 | MSNF#259 | MSNF#260 | MSNF#261 | MSNF#262 | MSNF#263 | MSNF#264 | MSNF#265 | MSNF#266 | MSNF#267 | MSNF#268 | MSNF#269 | MSNF#270 | MSNF#271 | MSNF#272 | MSNF#273 | MSNF#274 | MSNF#275 | MSNF#276 | MSNF#277 | MSNF#278 | MSNF#279 | MSNF#280 | MSNF#281 | MSNF#282 | MSNF#283 | MSNF#284 | MSNF#285 | MSNF#286 | MSNF#287 | MSNF#288 | MSNF#289 | MSNF#290 | MSNF#291 | MSNF#292 | MSNF#293 | MSNF#294 | MSNF#295 | MSNF#296 | MSNF#297 | MSNF#298 | MSNF#299 | MSNF#300 | MSNF#301 | MSNF#302 | MSNF#303 | MSNF#304 | MSNF#305 | MSNF#306 | MSNF#307 | MSNF#308 | MSNF#309 | MSNF#310 | MSNF#311 | MSNF#312 | MSNF#313 | MSNF#314 | MSNF#315 | MSNF#316 | MSNF#317 | MSNF#318 | MSNF#319 | MSNF#320 | MSNF#321 | MSNF#322 | MSNF#323 | MSNF#324 | MSNF#325 | MSNF#326 | MSNF#327 | MSNF#328 | MSNF#329 | MSNF#330 | MSNF#331 | MSNF#332 | MSNF#333 | MSNF#334 | MSNF#335 | MSNF#336 | MSNF#337 | MSNF#338 | MSNF#339 | MSNF#340 | MSNF#341 | MSNF#342 | MSNF#343 | MSNF#344 | MSNF#345 | MSNF |

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| All Param Count | 8244 | 13605 | 63223 | 159407 | 5207 | 15841 | 306915 | 386138 | 9568 | 52566 | 20437 | 4912 | 10235 | 11604 | 8132 | 7416 | 27882 | 39512 | 7452 | 18319 | 265977 | 381861 | 65544 | 82060.16 |
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|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |
|                 |      |       |       |        |      |       |        |        |      |       |       |      |       |       |      |      |       |       |      |       |        |        |       |          |

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## Entity report

| Entity name                | Entity type | Primary key  | # attributes |
|----------------------------|-------------|--|--------------|
| AC_HISTORY                 | independent | MDS, SER_NO, DATE, ENTRY_NUM   | 12           |
| ACTION_CODE                | independent | ACTION_CODE  | 6            |
| ACTIONS                    | independent | MDS, SER_NO, SYS_CODE, FAULT_DATE, FAULT_NO, ACT_NO                                  | 14           |
| AIRCRAFT                   | independent | MDS, SER_NO  | 43           |
| CNVRT                      | independent | LAS_TXT  | 7            |
| COMP_HIST                  | independent | MDS, SER_NO, WUC, CONFIG_Code, PN, PART_SN, DATE, ENTRY_NUM                          | 16           |
| COMPONENTS                 | independent | MDS, SER_NO, WUC, CONFIG_CODE, PN, PART_SN, LOCATION                                 | 35           |
| ComponentWriteups          | independent | MDS, SER_NO, WUC, CONFIG_CODE, PN, PART_SN, LOCATION, SYS_CODE, FAULT_DATE, FAULT_NO | 18           |
| CONFIG_CODE                | independent | MDS, CONFIG_CODE   | 7            |
| DELAY                      | independent | DELAY_CODE   | 6            |
| DTY_SYMBOL                 | independent | DTY_SYM  | 6            |
| ENG_COMPNTS                | independent | MDS, SER_NO, WUC, CONFIG_CODE, PN, PART_SN   | 63           |
| Eng_MODEL_LCF              | independent | Eng_Model  | 8            |
| FAILCODE                   | independent | FAIL_CODE  | 6            |
| FAULT                      | independent | MDS, SER_NO, SYS_CODE, FAULT_DATE, FAULT_NO  | 60           |
| FAULT_TIME_TEMP            | independent | MDS, SER_NO, SYS_CODE, FAULT_DATE, FAULT_NO  | 7            |
| FLIGHT                     | independent | MDS, SER_NO, MSN_DATE, FLIGHT_NO   | 61           |
| FLIGHT_CREW                | independent | MDS, SER_NO, MSN_DATE, FLIGHT_NO, PID_SEQ  | 33           |
| FLIGHT_MISS_RPT            | independent | MDS, SER_NO, MSN_DATE, FLIGHT_NO, TIME_START, PID                                    | 17           |
| FUNCTION_CODE              | independent | FUNCTION_CODE  | 6            |
| GEN_2410                   | independent | UIC, CNTRL_NUM, COPY   | 74           |
| HOW_REC                    | independent | HOW_REC_CODE   | 6            |
| INSP_LCF                   | independent | MDS, SYS_CODE, INSP_NO   | 20           |
| MAINT_LVL_LCF              | independent | MAINT_LEVEL  | 7            |
| MAINTENANCE_SUMMARY_REPORT | independent |  | 16           |
| MAJOR_NARR                 | independent | MDS, SER_NO  | 4            |
| MALFUNC_EFFECT             | independent | MALFUNC_EFFECT   | 6            |
| MSN_SUFFIX                 | independent | MSN_SUFFIX   | 6            |
| MSN_SYMBOL                 | independent | MSN_SYMBOL   | 6            |
| PARTS_LCF                  | independent | MDS, WUC, PN, CONFIG_CODE  | 31           |
| PRINT_2410                 | independent | UIC, CNTRL_NUM, COPY   | 74           |
| REL_MAINT                  | independent | MDS, SER_NO, SYS_CODE, FAULT_DATE, FAULT_NO, RM_SEQ_NO                               | 22           |
| REM_ENG_COMPNTS            | independent | MDS, SER_NO, WUC, CONFIG_CODE, PN, PART_SN, SEQ_NO                                   | 63           |
| REM_MWO_COMPNT             | independent | MDS, SER_NO, WUC, CONFIG_CODE, PN, PART_SN, LOCATION, MWO_NUMBER                     | 17           |
| REMOVED_COMPONENTS         | independent | MDS, SER_NO, WUC, CONFIG_CODE, PN, PART_SN, LOCATION, SEQ_NO                         | 35           |
| RM_ACTIONS                 | independent | MDS, SER_NO, SYS_CODE,   | 15           |

|             |             |   |    |
|-------------|-------------|---|----|
|             |             | FAULT_DATE, FAULT_NO,<br>RM_SEQ_NO, RM_ACT_NO |    |
| SCH_INSP    | independent | MDS, SER_NO, SYS_CODE, INSP_NO                | 23 |
| SERV_CODE   | independent | SERVICE_CODE                                  | 6  |
| SERVICING   | independent | MDS, SER_NO, MSN_DATE,<br>FLIGHT_NO, SRV_SEQ  | 37 |
| STATUS      | independent | STATUS  | 8  |
| T700_LCF    | independent | EN_MODEL, FAT, PRESALT                        | 4  |
| TRANS_CODE  | independent | TRANS_CODE                                    | 6  |
| UNIT_LCF    | independent | UIC   | 26 |
| UTIL_LCF    | independent | UTIL_CODE                                     | 6  |
| WHEN_DISC   | independent | WHEN_DISC                                     | 6  |
| WORK_ORDERS | independent | CNTRL_NO                                      | 62 |
| WUC         | independent | MDS, WUC                                      | 9  |

## Entity 'AC\_HISTORY'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | AC_HISTORY  |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                             |
|-----|---------------------|-----------|----------|--------|---|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series)           |
| PK  | SER_NO              | Text      | YES      | NO     | Serial Number                           |
| PK  | DATE                | Date/Time | YES      | NO     | Date Remarks were Entered               |
| PK  | ENTRY_NUM           | Integer   | YES      | NO     | Entry Number                            |
|     | REMARKS             | Memo      | NO       | NO     | Remarks                                 |
|     | ORG                 | Text      | NO       | NO     | Organization Making Entry               |
|     | LOC                 | Text      | NO       | NO     | Location of Aircraft when Entry is Made |
|     | PID                 | Text      | NO       | NO     | PID of Person Making Entry              |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date                   |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time                   |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID                    |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag                     |



## Entity 'ACTION\_CODE'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | ACTION_CODE |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description           |
|-----|---------------------|-----------|----------|--------|-----------------------|
| PK  | ACTION_CODE         | Text      | YES      | NO     | Action Code           |
|     | CODE_NARR           | Text      | NO       | NO     | Action Code Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID  |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag   |

## Entity 'ACTIONS'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | ACTIONS     |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                        |
|-----|---------------------|-----------|----------|--------|------------------------------------|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series)      |
| PK  | SER_NO              | Text      | YES      | NO     | Aircraft Serial Number             |
| PK  | SYS_CODE            | Text      | YES      | NO     | System Code                        |
| PK  | FAULT_DATE          | Date/Time | YES      | NO     | Date of Fault                      |
| PK  | FAULT_NO            | Integer   | YES      | NO     | Fault Number                       |
| PK  | ACT_NO              | Byte      | YES      | NO     | Maintenance Record Sequence Number |
|     | PID_ACTION          | Text      | NO       | NO     | Action Code                        |
|     | PID                 | Text      | NO       | NO     | Personal Identification            |
|     | LVL_MAINT           | Text      | NO       | NO     | Level of Maintenance               |
|     | MAN_HOURS           | Single    | NO       | NO     | Man Hours                          |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date              |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time              |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID               |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag                |

Entity 'AIRCRAFT'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | AIRCRAFT    |
| <b>Entity type</b> | independent |

**User-defined variables**

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type    | Not null | Unique | Description   |
|-----|---------------------|--------------|----------|--------|---|
| PK  | MDS                 | Text         | YES      | NO     | Mission Design Series   |
| PK  | SER_NO              | Text         | YES      | NO     | Serial Number of Aircraft   |
|     | UIC                 | Text         | NO       | NO     | Unit Identification Code  |
|     | STATION             | Text         | NO       | NO     | Station of Unit (Location)  |
|     | START_HRS           | Single       | NO       | NO     | Automation Start Hours for Aircraft                                 |
|     | START_DATE          | Date/Time    | NO       | NO     | Automation Start Date   |
|     | CURR_HRS            | Single       | NO       | NO     | Current Hours   |
|     | DATE                | Date/Time    | NO       | NO     | Date of Last Mission  |
|     | START_RNDS          | Long Integer | NO       | NO     | Automation Start Rounds   |
|     | CURR_RNDS           | Long Integer | NO       | NO     | Current Rounds  |
|     | PHASE_DUE           | Single       | NO       | NO     | Hours Next Phase is Due   |
|     | PHASE_NUM_DUE       | Byte         | NO       | NO     | Number of Next Phase (1,2,3,4)                                      |
|     | CYCLE_NUM_DUE       | Byte         | NO       | NO     | Cycle Number Due (1,2,3,4)  |
|     | LAST_FP             | Date/Time    | NO       | NO     | Date Last Flight Pack was Generated                                 |
|     | APU_HOURS           | Single       | NO       | NO     | Current APU Hours   |
|     | APU_STARTS          | Long Integer | NO       | NO     | Current APU Starts  |
|     | APU_METER_HOURS     | Long Integer | NO       | NO     | Current APU Meter Hours   |
|     | EngApuReadingsDate  | Date/Time    | NO       | NO     | Date of last engine APU readings                                    |
|     | EngApuReadingsPID   | Text         | NO       | NO     | PID of person who took engine APU readings                          |
|     | Eng1Starts          | Long Integer | NO       | NO     | Current starts for engine 1   |
|     | Eng2Starts          | Long Integer | NO       | NO     | Current starts for engine 2   |
|     | HSF                 | Long Integer | NO       | NO     | Hot Section Factors   |
|     | CYCLES              | Long Integer | NO       | NO     | Current Cycles  |
|     | LANDINGS            | Long Integer | NO       | NO     | Current number of Std Landings                                      |
|     | LANDINGS_AUTO       | Long Integer | NO       | NO     | Current number of Auto Landings                                     |
|     | CREW_CHIEF_NAME     | Text         | NO       | NO     | Crew Chiefs Name  |
|     | SUPERVISOR_NAME     | Text         | NO       | NO     | Supervisors Name  |
|     | STATUS_AC           | Text         | NO       | NO     | ACFT STATUS   |
|     | STATUS_EL           | Text         | NO       | NO     | ELECT. STATUS   |
|     | STATUS_AR           | Text         | NO       | NO     | WEAPON STATUS   |
|     | STATUS_OT           | Text         | NO       | NO     | OTHER STATUS  |
|     | TAG_ID              | Text         | NO       | NO     | Uniquely identifies this MDS&SER_NO in logbook migration filenames. |
|     | DATE10HR14DAY       | Date/Time    | NO       | NO     | Date last 10 Hour/14 Day Inspection was performed                   |
|     | HRS10HR14DAY        | Single       | NO       | NO     | Aircraft Hours when last 10 Hour/14 Day Inspection was performed    |
|     | PMD_DATE            | Date/Time    | NO       | NO     | Date Last Preventive Maintenance Daily was performed.               |
|     | PMD_HOURS           | Single       | NO       | NO     | Aircraft hours at time last PMD was performed.                      |
|     | PMD_PID             | Text         | NO       | NO     | PID of person who performed last PMD.                               |
|     | LASTMIGDATE         | Date/Time    | NO       | NO     | Last Date Migration file was received from this aircraft.           |
|     | LASTMIGTIME         | Date/Time    | NO       | NO     | Last Time Migration file was received from this aircraft.           |
|     | DATE_STAMP          | Date/Time    | NO       | NO     | Last Transaction Date   |
|     | TIME_STAMP          | Date/Time    | NO       | NO     | Last Transaction Time   |
|     | PID_STAMP           | Text         | NO       | NO     | Last Transaction PID  |
|     | DEL_FLAG            | Yes/No       | NO       | NO     | Logical Delete Flag   |

## Entity 'CNVRT'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | CNVRT       |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type    | Not null | Unique | Description   |
|-----|---------------------|--------------|----------|--------|---|
| PK  | LAS_TXT             | Text         | YES      | NO     | LAS conversion text file name (AIRCRAFT.TXT)                  |
|     | ELAS_TABLE          | Text         | NO       | NO     | Corresponding ELAS table data is transferred to               |
|     | ELAS_REC_NUM        | Long Integer | NO       | NO     | Number of records in the ELAS table once transfer is complete |
|     | ERR_TABLE           | Text         | NO       | NO     | Error table name, if created                                  |
|     | ERR_REC_NUM         | Long Integer | NO       | NO     | Number of records in the error table                          |
|     | DATE                | Date/Time    | NO       | NO     |   |
|     | REMARKS             | Text         | NO       | NO     | Remarks as needed   |

## Entity 'COMP\_HIST'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | COMP_HIST   |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                             |
|-----|---------------------|-----------|----------|--------|---|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series)           |
| PK  | SER_NO              | Text      | YES      | NO     | Serial Number                           |
| PK  | WUC                 | Text      | YES      | NO     |   |
| PK  | CONFIG_Code         | Byte      | YES      | NO     |   |
| PK  | PN                  | Text      | YES      | NO     | Part Number                             |
| PK  | PART_SN             | Text      | YES      | NO     | Part Serial Number                      |
| PK  | DATE                | Date/Time | YES      | NO     | Date Remarks were Entered               |
| PK  | ENTRY_NUM           | Integer   | YES      | NO     | Entry Number                            |
|     | REMARKS             | Memo      | NO       | NO     | Remarks                                 |
|     | ORG                 | Text      | NO       | NO     | Organization Making Entry               |
|     | LOC                 | Text      | NO       | NO     | Location of Aircraft when Entry is Made |
|     | PID                 | Text      | NO       | NO     | PID of Person Making Entry              |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date                   |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time                   |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID                    |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag                     |

## Entity 'COMPONENTS'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | COMPONENTS  |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name   | Data type    | Not null | Unique | Description  |
|-----|-----------------------|--------------|----------|--------|--|
| PK  | MDS                   | Text         | YES      | NO     | Model (Mission Design Series)                          |
| PK  | SER_NO                | Text         | YES      | NO     | Serial Number  |
| PK  | WUC                   | Text         | YES      | NO     | Discovery Work Unit Code                               |
| PK  | CONFIG_CODE           | Byte         | YES      | NO     | Code that Identifies Unique Configurations             |
| PK  | PN                    | Text         | YES      | NO     | Part Number  |
| PK  | PART_SN               | Text         | YES      | NO     | Part Serial Number                                     |
| PK  | LOCATION              | Text         | YES      | NO     | Location of Part Serial Number                         |
|     | SEQ_NO                | Byte         | NO       | NO     | Sequence Number  |
|     | NEXT_HIGH_WUC         | Text         | NO       | NO     | WUC of the Next Highest Level Component                |
|     | NEXT_HIGH_CONFIG      | Byte         | NO       | NO     | Configuration Code of the Next Highest Level Component |
|     | NEXT_HIGH_PN          | Text         | NO       | NO     | Part Number of the Next Highest Level Component        |
|     | NEXT_HIGH_SN          | Text         | NO       | NO     | Serial Number of the Next Highest Level Component      |
|     | NEXT_HIGH_LOC         | Text         | NO       | NO     | Location of the Next Highest Level Component           |
|     | NO_OVHLS              | Text         | NO       | NO     | Number of Overhauls                                    |
|     | N INST HRS            | Long Integer | NO       | NO     | Hours on Nomenclature at Installation                  |
|     | N RMVL HRS            | Long Integer | NO       | NO     | Hours on Nomenclature at Removal                       |
|     | C INST HRS            | Long Integer | NO       | NO     | Hours on Component at Installation                     |
|     | C RMVL HRS            | Long Integer | NO       | NO     | Hours on Component at Removal                          |
|     | TSOH                  | Text         | NO       | NO     | Time Since Overhaul                                    |
|     | REPLACE_DUE           | Long Integer | NO       | NO     | Replacement Due Hours                                  |
|     | RETIREMENT_DUE        | Long Integer | NO       | NO     | Retirement Due Hours                                   |
|     | REMARKS               | Memo         | NO       | NO     | Significant Historical Data on Part                    |
|     | INSTALL_STATUS        | Text         | NO       | NO     | Status of Part (Installed/Removed/Cannibalized)        |
|     | PRINT_FLAG_2410       | Yes/No       | NO       | NO     | Has a 2410 been Printed?                               |
|     | DATE_INST             | Date/Time    | NO       | NO     | Date Part was Installed                                |
|     | DATE_RMVL             | Date/Time    | NO       | NO     | Date Part was Removed                                  |
|     | SERV_CODE             | Text         | NO       | NO     | Serviceability Code for 2410 Generation                |
|     | FAIL_CODE             | Text         | NO       | NO     | Failure Code   |
|     | AOAP                  | Yes/No       | NO       | NO     | Is this part in the -20 Army Oil Analysis Program      |
|     | CNTRL_NUM             | Text         | NO       | NO     | 2410 Control Number                                    |
|     | QDR_REPORT_CONTROL_NO | Text         | NO       | NO     | RCN Generated by QDARS system                          |
|     | DATE_STAMP            | Date/Time    | NO       | NO     | Last Transaction Date                                  |
|     | TIME_STAMP            | Date/Time    | NO       | NO     | Last Transaction Time                                  |
|     | PID_STAMP             | Text         | NO       | NO     | Last Transaction PID                                   |
|     | DEL_FLAG              | Yes/No       | NO       | NO     | Logical Delete Flag                                    |

## Entity 'ComponentWriteups'

|                    |                   |
|--------------------|-------------------|
| <b>Entity name</b> | ComponentWriteups |
| <b>Entity type</b> | independent       |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type    | Not null | Unique | Description                                 |
|-----|---------------------|--------------|----------|--------|---|
| PK  | MDS                 | Text         | YES      | NO     | Model (Mission Design Series)               |
| PK  | SER_NO              | Text         | YES      | NO     | Serial Number                               |
| PK  | WUC                 | Text         | YES      | NO     | Discovery Work Unit Code                    |
| PK  | CONFIG_CODE         | Byte         | YES      | NO     | Code that Identifies Unique Configurations  |
| PK  | PN                  | Text         | YES      | NO     | Part Number                                 |
| PK  | PART_SN             | Text         | YES      | NO     | Part Serial Number                          |
| PK  | LOCATION            | Text         | YES      | NO     | Location of Part Serial Number              |
| PK  | SYS_CODE            | Text         | YES      | NO     | System Code                                 |
| PK  | FAULT_DATE          | Date/Time    | YES      | NO     | Date of Fault                               |
| PK  | FAULT_NO            | Integer      | YES      | NO     | Fault Number                                |
|     | REPLACE_DUE         | Long Integer | NO       | NO     | Replacement Due Hours                       |
|     | IsA161              | Yes/No       | NO       | NO     | Is this Write-up for a 2408-16-1 component? |
|     | UpgradedFaultDate   | Date/Time    | NO       | NO     | Date of upgraded Fault                      |
|     | UpgradedFaultNo     | Integer      | NO       | NO     | Upgraded Fault number                       |
|     | DATE_STAMP          | Date/Time    | NO       | NO     | Last Transaction Date                       |
|     | TIME_STAMP          | Date/Time    | NO       | NO     | Last Transaction Time                       |
|     | PID_STAMP           | Text         | NO       | NO     | Last Transaction PID                        |
|     | DEL_FLAG            | Yes/No       | NO       | NO     | Logical Delete Flag                         |



## Entity 'CONFIG\_CODE'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | CONFIG_CODE |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description  |
|-----|---------------------|-----------|----------|--------|--|
| PK  | MDS                 | Text      | YES      | NO     | Model Design Series  |
| PK  | CONFIG_CODE         | Double    | YES      | NO     | Configuration Code number. Used to identify the change to TBO times and text |
|     | CONFIG_TEXT         | Text      | NO       | NO     | Reason or reference for configuration code                                   |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date  |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time  |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID   |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag  |

## Entity 'DELAY'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | DELAY       |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description           |
|-----|---------------------|-----------|----------|--------|-----------------------|
| PK  | DELAY_CODE          | Text      | YES      | NO     | DELAY CODE            |
|     | DELAY_CODE_NARR     | Text      | NO       | NO     | Delay Code Narrative  |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID  |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag   |

## Entity 'DTY\_SYMBOL'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | DTY_SYMBOL  |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description           |
|-----|---------------------|-----------|----------|--------|-----------------------|
| PK  | DTY_SYM             | Text      | YES      | NO     | Duty Symbol           |
|     | DTY_SYM_NARR        | Text      | NO       | NO     | Duty Symbol Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID  |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag   |

Entity 'ENG\_COMPNTS'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | ENG_COMPNTS |
| <b>Entity type</b> | independent |

**User-defined variables**

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type    | Not null | Unique | Description   |
|-----|---------------------|--------------|----------|--------|---|
| PK  | MDS                 | Text         | YES      | NO     | Model (Mission Design Series)                                   |
| PK  | SER_NO              | Text         | YES      | NO     | Serial Number   |
| PK  | WUC                 | Text         | YES      | NO     | Discovery Work Unit Code  |
| PK  | CONFIG_CODE         | Byte         | YES      | NO     | Code that Identifies Unique Configurations                      |
| PK  | PN                  | Text         | YES      | NO     | Part Number   |
| PK  | PART_SN             | Text         | YES      | NO     | Part Serial Number  |
|     | SEQ_NO              | Byte         | NO       | NO     | Sequence Number   |
|     | LOCATION            | Text         | NO       | NO     | Location of Part Serial Number                                  |
|     | NEXT_HIGH_WUC       | Text         | NO       | NO     | WUC of the Next Highest Level Component                         |
|     | NEXT_HIGH_CONFIG    | Byte         | NO       | NO     | Configuration Code of the Next Highest Level Component          |
|     | NEXT_HIGH_PN        | Text         | NO       | NO     | Part Number of the Next Highest Level Component                 |
|     | NEXT_HIGH_SN        | Text         | NO       | NO     | Serial Number of the Next Highest Level Component               |
|     | LCF1_LN1            | Long Integer | NO       | NO     | LCF-1 Total Counts on Component at Installation                 |
|     | LCF1_LN2            | Long Integer | NO       | NO     | LCF-1 History Recorder Reading at Installation                  |
|     | LCF1_LN3            | Long Integer | NO       | NO     | LCF-1 History Recorder Reading at Removal                       |
|     | LCF1_LN4            | Long Integer | NO       | NO     | LCF-1 Time Since Install (Line 3 minus Line 2)                  |
|     | LCF1_LN5            | Long Integer | NO       | NO     | LCF-1 Total Counts on Component at Removal (Line 4 plus Line 1) |
|     | LCF2_LN1            | Long Integer | NO       | NO     | LCF-2 Total Counts on Component at Installation                 |
|     | LCF2_LN2            | Long Integer | NO       | NO     | LCF-2 History Recorder Reading at Installation                  |
|     | LCF2_LN3            | Long Integer | NO       | NO     | LCF-2 History Recorder Reading at Removal                       |
|     | LCF2_LN4            | Long Integer | NO       | NO     | LCF-2 Time Since Install (Line 3 minus Line 2)                  |
|     | LCF2_LN5            | Long Integer | NO       | NO     | LCF-2 Total Counts on Component at Removal (Line 4 plus Line 1) |
|     | TTI_LN1             | Long Integer | NO       | NO     | TTI Total Counts on Component at Installation                   |
|     | TTI_LN2             | Long Integer | NO       | NO     | TTI History Recorder Reading at Installation                    |
|     | TTI_LN3             | Long Integer | NO       | NO     | TTI History Recorder Reading at Removal                         |
|     | TTI_LN4             | Long Integer | NO       | NO     | TTI Time Since Install (Line 3 minus Line 2)                    |
|     | TTI_LN5             | Long Integer | NO       | NO     | TTI Total Counts on Component at Removal (Line 4 plus Line 1)   |
|     | OPH_LN1             | Long Integer | NO       | NO     | OPHRS Total Counts on Component at Installation                 |
|     | OPH_LN2             | Long Integer | NO       | NO     | OPHRS History Recorder Reading at Installation                  |
|     | OPH_LN3             | Long Integer | NO       | NO     | OPHRS History Recorder Reading at Removal                       |
|     | OPH_LN4             | Long Integer | NO       | NO     | OPHRS Time Since Install (Line 3 minus Line 2)                  |
|     | OPH_LN5             | Long Integer | NO       | NO     | OPHRS Total Counts on Component at Removal (Line 4 plus Line 1) |
|     | REV_NHA_LCF1_INST   | Long Integer | NO       | NO     | Reverse Side NHA LCF1 Inst Component Counts                     |
|     | REV_NHA_LCF2_INST   | Long Integer | NO       | NO     | Reverse Side NHA LCF2 Inst Component Counts                     |
|     | REV_NHA_TTI_INST    | Long Integer | NO       | NO     | Reverse Side NHA TTI Inst Component Counts                      |
|     | REV_NHA_OPHRS_INST  | Long Integer | NO       | NO     | Reverse Side NHA OP Hrs Inst Component Counts                   |

|                           |              |    |    |  |
|---------------------------|--------------|----|----|--|
| REV_NHA_LCF1_RMV<br>L     | Long Integer | NO | NO | Reverse Side NHA LCF1 Rmvl<br>Component Counts       |
| REV_NHA_LCF2_RMV<br>L     | Long Integer | NO | NO | Reverse Side NHA LCF2 Rmvl<br>Component Counts       |
| REV_NHA_TTI_RMV           | Long Integer | NO | NO | Reverse Side NHA TTI Rmvl<br>Component Counts        |
| REV_NHA_OPHRS_R<br>MVL    | Long Integer | NO | NO | Reverse Side NHA OP Hrs Rmvl<br>Component Counts     |
| REV_SUB_LCF1_INST         | Long Integer | NO | NO | Reverse Side SUB LCF1 Inst<br>Component Counts       |
| REV_SUB_LCF2_INST         | Long Integer | NO | NO | Reverse Side SUB LCF2 Inst<br>Component Counts       |
| REV_SUB_TTI_INST          | Long Integer | NO | NO | Reverse Side SUB TTI Inst<br>Component Counts        |
| REV_SUB_OPHRS_I<br>NST    | Long Integer | NO | NO | Reverse Side SUB OP Hrs Inst<br>Component Counts     |
| REPLACE_DUE               | Long Integer | NO | NO | Replacement Due Hours                                |
| RETIREMENT_DUE            | Long Integer | NO | NO | Retirement Due Hours                                 |
| HIST_RCDR_SN              | Text         | NO | NO | History Recorder Serial Number                       |
| REMARKS                   | Memo         | NO | NO | Significant Historical Data on Part                  |
| INSTALL_STATUS            | Text         | NO | NO | Status of Part<br>(Installed/Removed/Cannibalized)   |
| PRINT_FLAG_2410           | Yes/No       | NO | NO | Has a 2410 been Printed?                             |
| DATE_INST                 | Date/Time    | NO | NO | Date Part was Installed                              |
| DATE_RMV                  | Date/Time    | NO | NO | Date Part was Removed                                |
| AC_HRS_INST               | Long Integer | NO | NO | Hours on AC at eng component install                 |
| AC_HRS_RMV                | Long Integer | NO | NO | Hours on AC at eng component<br>removal              |
| SERV_CODE                 | Text         | NO | NO | Serviceability Code for 2410<br>Generation           |
| FAIL_CODE                 | Text         | NO | NO | Failure Code   |
| AOAP                      | Yes/No       | NO | NO | Is this part in the -20 Army Oil Analysis<br>Program |
| CNTRL_NUM                 | Text         | NO | NO | 2410 Control Number                                  |
| QDR_REPORT_CON<br>TROL_NO | Text         | NO | NO | RCN Generated by QDARS system                        |
| DATE_STAMP                | Date/Time    | NO | NO | Last Transaction Date                                |
| TIME_STAMP                | Date/Time    | NO | NO | Last Transaction Time                                |
| PID_STAMP                 | Text         | NO | NO | Last Transaction PID                                 |
| DEL_FLAG                  | Yes/No       | NO | NO | Logical Delete Flag                                  |

## Entity 'Eng\_MODEL\_LCF'

|                    |               |
|--------------------|---------------|
| <b>Entity name</b> | Eng_MODEL_LCF |
| <b>Entity type</b> | independent   |

## User-defined variables

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| <b>Key</b> | <b>Attribute/role name</b> | <b>Data type</b> | <b>Not null</b> | <b>Unique</b> | <b>Description</b>   |
|------------|----------------------------|------------------|-----------------|---------------|--|
| PK         | Eng_Model                  | Text             | YES             | NO            | Engine model number  |
|            | Eng_Desc                   | Text             | NO              | NO            | Engine descriptions  |
|            | Eng_Forms                  | Text             | NO              | NO            | Applicable dash 19 form numbers for engine. i.e. any combination of 1, 2, and 3. |
|            | TGT_Header                 | Text             | NO              | NO            | Heading used for Block 11 on the 2408-19-2                                       |
|            | DATE_STAMP                 | Date/Time        | NO              | NO            | Last Transaction Date  |
|            | TIME_STAMP                 | Date/Time        | NO              | NO            | Last Transaction Time  |
|            | PID_STAMP                  | Text             | NO              | NO            | Last Transaction PID   |
|            | DEL_FLAG                   | Yes/No           | NO              | NO            | Logical Delete Flag  |

## Entity 'FAILCODE'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | FAILCODE    |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                      |
|-----|---------------------|-----------|----------|--------|----------------------------------|
| PK  | FAIL_CODE           | Text      | YES      | NO     | Failure Code from DA PAM 738-751 |
|     | FAIL_CODE_NARR      | Text      | NO       | NO     | Failure Code Description         |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date            |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time            |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID             |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag              |



Entity 'FAULT'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | FAULT       |
| <b>Entity type</b> | independent |

**User-defined variables**

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type    | Not null | Unique | Description  |
|-----|---------------------|--------------|----------|--------|--|
| PK  | MDS                 | Text         | YES      | NO     | Model (Mission Design Series)  |
| PK  | SER_NO              | Text         | YES      | NO     | Aircraft Serial Number   |
| PK  | SYS_CODE            | Text         | YES      | NO     | System Code  |
| PK  | FAULT_DATE          | Date/Time    | YES      | NO     | Date of Fault  |
| PK  | FAULT_NO            | Integer      | YES      | NO     | Fault Number   |
|     | DISC_TIME           | Date/Time    | NO       | NO     | Fault Discovery Time   |
|     | STATUS              | Text         | NO       | NO     | Status of Fault  |
|     | DISC_PID            | Text         | NO       | NO     | PID of Personnel Discovering Fault   |
|     | AC_HRS              | Single       | NO       | NO     | Aircraft Hours at Fault Discovery  |
|     | APU_HOURS           | Single       | NO       | NO     | Number of APU Hours at Fault Discovery   |
|     | APU_STARTS          | Long Integer | NO       | NO     | Number of APU Starts at Fault Discovery  |
|     | RNDS                | Long Integer | NO       | NO     | Number of Rounds at Fault Discovery  |
|     | CYCLES              | Long Integer | NO       | NO     | Number of Landing Gear Cycles at Fault Discovery                               |
|     | LANDINGS            | Long Integer | NO       | NO     | Number of Landings at Fault Discovery  |
|     | WHEN_DISC           | Text         | NO       | NO     | When Discovered Code   |
|     | HOW_REC             | Text         | NO       | NO     | How Recognized Code  |
|     | MAL_EFF             | Text         | NO       | NO     | Mission Malfunction Effect Code  |
|     | WUC                 | Text         | NO       | NO     | Discovery Work Unit Code   |
|     | MAINT_TYPE          | Text         | NO       | NO     | Maintenance Type   |
|     | DELAY               | Text         | NO       | NO     | Delay Field (Concatenates WO_NO, REQ_NO, OTHER) change in 738-751 for ELAS 3.3 |
|     | AUTO_14             | Yes/No       | NO       | NO     | Treat Fault as a -14 (Y or N)  |
|     | PID_14              | Text         | NO       | NO     | PID Authorizing Transfer to -14  |
|     | DATE_14             | Date/Time    | NO       | NO     | Date Transferred to -14  |
|     | DELAY_1             | Text         | NO       | NO     | Fault Delay 1 Code   |
|     | DAYS_1              | Integer      | NO       | NO     | Number of Days Delayed (1)   |
|     | DELAY_2             | Text         | NO       | NO     | Fault Delay 2 Code   |
|     | DAYS_2              | Integer      | NO       | NO     | Number of Days Delayed (2)   |
|     | DELAY_3             | Text         | NO       | NO     | Fault Delay 3 Code   |
|     | DAYS_3              | Integer      | NO       | NO     | Number of Days Delayed (3)   |
|     | FAULT               | Memo         | NO       | NO     | Fault Narrative  |
|     | CORR_DATE           | Date/Time    | NO       | NO     | Fault Correction Date  |
|     | CORR_TIME           | Date/Time    | NO       | NO     | Fault Correction Time  |
|     | CORR_WUC            | Text         | NO       | NO     | Correction WUC   |
|     | CORR_AC_HRS         | Single       | NO       | NO     | Aircraft Hours at Correction   |
|     | CORR_RNDS           | Long Integer | NO       | NO     | Rounds at Correction   |
|     | CORR_APU_HOURS      | Single       | NO       | NO     | APU Hours at Correction  |
|     | CORR_APU_STARTS     | Long Integer | NO       | NO     | APU Starts at Correction   |
|     | CORR_CYCLES         | Long Integer | NO       | NO     | Number of Landing Gear Cycles at Correction                                    |
|     | CORR_LANDINGS       | Long Integer | NO       | NO     | Landings at Correction   |
|     | ACT_CODE            | Text         | NO       | NO     | Action Taken Code to Correct Fault   |
|     | ACTION              | Memo         | NO       | NO     | Corrective Action Narrative  |
|     | TI_PID              | Text         | NO       | NO     | Technical Inspector PID  |
|     | TI_LVL              | Text         | NO       | NO     | Level of Maintenance of TI   |
|     | TI_MMH              | Single       | NO       | NO     | Technical Inspector Man-Hours  |
|     | FMF_CODE            | Text         | NO       | NO     | Field Monitor Function Code  |
|     | FMC_CODE            | Text         | NO       | NO     | Field Monitor Charge Code  |
|     | FM_FLAG             | Yes/No       | NO       | NO     | Field Monitor Off/On Flag  |
|     | SYS_GEN             | Yes/No       | NO       | NO     | Is this a System Generated Fault   |
|     | CLOSED              | Yes/No       | NO       | NO     | Has this Fault been Closed   |

|  |            |           |    |    |                                  |
|--|------------|-----------|----|----|----------------------------------|
|  | INSP_CODE  | Text      | NO | NO | Applicable Inspection Code       |
|  | PST_CODE   | Text      | NO | NO | Parts Summary Transaction Code   |
|  | PSF_CODE   | Text      | NO | NO | Parts Summary Fail Code          |
|  | PS_WUC     | Text      | NO | NO | Parts Summary WUC                |
|  | PS_NOMEN   | Text      | NO | NO | Parts Summary Nomenclature       |
|  | PS_PN_NSN  | Text      | NO | NO | Parts Summary Part Number or NSN |
|  | PS_QTY     | Integer   | NO | NO | Parts Summary Quantity           |
|  | DATE_STAMP | Date/Time | NO | NO | Last Transaction Date            |
|  | TIME_STAMP | Date/Time | NO | NO | Last Transaction Time            |
|  | PID_STAMP  | Text      | NO | NO | Last Transaction PID             |
|  | DEL_FLAG   | Yes/No    | NO | NO | Logical Delete Flag              |

## Entity 'FAULT\_TIME\_TEMP'

|                    |                 |
|--------------------|-----------------|
| <b>Entity name</b> | FAULT_TIME_TEMP |
| <b>Entity type</b> | independent     |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                   |
|-----|---------------------|-----------|----------|--------|-------------------------------|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series) |
| PK  | SER_NO              | Text      | YES      | NO     | Aircraft Serial Number        |
| PK  | SYS_CODE            | Text      | YES      | NO     | System Code                   |
| PK  | FAULT_DATE          | Date/Time | YES      | NO     | Date of Fault                 |
| PK  | FAULT_NO            | Integer   | YES      | NO     | Fault Number                  |
|     | DISC_TIME           | Text      | NO       | NO     | Fault Discovery Time          |
|     | CORR_TIME           | Text      | NO       | NO     | Fault Correction Time         |

Entity 'FLIGHT'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | FLIGHT      |
| <b>Entity type</b> | independent |

**User-defined variables**

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type    | Not null | Unique | Description                                    |
|-----|---------------------|--------------|----------|--------|--|
| PK  | MDS                 | Text         | YES      | NO     | Model (Mission Design Series)                  |
| PK  | SER_NO              | Text         | YES      | NO     | Aircraft Serial Number                         |
| PK  | MSN_DATE            | Date/Time    | YES      | NO     | Mission Date                                   |
| PK  | FLIGHT_NO           | Byte         | YES      | NO     | Flight Number                                  |
|     | CUR_HOURS           | Single       | NO       | NO     | Current Hours on Aircraft at Time of Mission   |
|     | STATION1            | Text         | NO       | NO     | Station at Start of Flight                     |
|     | STATION2            | Text         | NO       | NO     | Intermediate Stop                              |
|     | STATION3            | Text         | NO       | NO     | Station at End of Flight                       |
|     | TIME_START          | Date/Time    | NO       | NO     | Time of Mission Start                          |
|     | IMD_TIME            | Date/Time    | NO       | NO     | Time at Intermediate Stop                      |
|     | TIME_STOP           | Date/Time    | NO       | NO     | Time at Mission Stop                           |
|     | FLT_HRS             | Single       | NO       | NO     | Flight Hours                                   |
|     | LAND_STD            | Byte         | NO       | NO     | Number of Standard Landing                     |
|     | LAND_AUTO           | Byte         | NO       | NO     | Number of Autorotations                        |
|     | MSN_SYMB            | Text         | NO       | NO     | Mission Symbol                                 |
|     | MSN_PEC             | Text         | NO       | NO     | Mission Peculiar                               |
|     | MSN_SUFFIX          | Text         | NO       | NO     | Mission Suffix                                 |
|     | RHC                 | Integer      | NO       | NO     | Rescue Hoist Landing Cycles                    |
|     | E&R                 | Integer      | NO       | NO     | Refuel Probe Extensions and Retractions        |
|     | CONN                | Integer      | NO       | NO     | Refuel Probe Connections                       |
|     | CONFIG              | Text         | NO       | NO     | Mission Configuration                          |
|     | LOAD_INT            | Long Integer | NO       | NO     | Internal Load in Pounds                        |
|     | LOAD_EXT            | Long Integer | NO       | NO     | External Load in Pounds                        |
|     | PAX                 | Byte         | NO       | NO     | Number of Passengers                           |
|     | CYCLES              | Byte         | NO       | NO     | Number of Landing Gear Cycles                  |
|     | HSF                 | Long Integer | NO       | NO     | Hot Section Factors                            |
|     | HIT_TEST1           | Text         | NO       | NO     | HIT Results, Engine 1                          |
|     | HIT_TEST2           | Text         | NO       | NO     | HIT Results, Engine 2                          |
|     | HOT1                | Byte         | NO       | NO     | Hot Starts, Engine 1                           |
|     | HOT2                | Byte         | NO       | NO     | Hot Starts, Engine 2                           |
|     | HOT_APU             | Byte         | NO       | NO     | Hot Starts, APU                                |
|     | APU_HOURS           | Single       | NO       | NO     | Hours on APU                                   |
|     | APU_HR_METER        | Single       | NO       | NO     | Hours on APU Meter                             |
|     | FLT_REMARKS         | Text         | NO       | NO     | Flight Remarks                                 |
|     | STAT_762            | Text         | NO       | NO     | Status of 7.62                                 |
|     | STAT_20             | Text         | NO       | NO     | Status of 20                                   |
|     | STAT_30             | Text         | NO       | NO     | Status of 30                                   |
|     | STAT_40             | Text         | NO       | NO     | Status of 40                                   |
|     | STAT_RKT            | Text         | NO       | NO     | Status of Rocket                               |
|     | STAT_TOW            | Text         | NO       | NO     | Status of TOW                                  |
|     | WPN_OTHER           | Text         | NO       | NO     | Name of Other Weapon System                    |
|     | STAT_OTHER          | Text         | NO       | NO     | Status of Other Weapon                         |
|     | RNDS_762            | Long Integer | NO       | NO     | Number of Rounds Fired 7.62                    |
|     | RNDS_20             | Long Integer | NO       | NO     | Number of Rounds Fired 20                      |
|     | RNDS_30             | Long Integer | NO       | NO     | Number of Rounds Fired 30                      |
|     | RNDS_40             | Integer      | NO       | NO     | Number of Rounds Fired 40                      |
|     | RNDS_RKTS           | Integer      | NO       | NO     | Number of Rounds Fired Rockets                 |
|     | RNDS_TOW            | Byte         | NO       | NO     | Number of Rounds Fired TOW                     |
|     | RNDS_OTHER          | Long Integer | NO       | NO     | Number of Rounds Fired Other Weapon            |
|     | ENG1_LCF1           | Long Integer | NO       | NO     | Engine 1 LCF-1 Reading for T700 Series Engines |
|     | ENG1_LCF2           | Long Integer | NO       | NO     | Engine 1 LCF-2 Reading for T700                |

|  |             |              |    |    | Series Engines   |
|--|-------------|--------------|----|----|--|
|  | ENG1_TTI    | Long Integer | NO | NO | Engine 1 Time/Temp Index Reading for T700 Series Engines |
|  | ENG1_OP_HRS | Long Integer | NO | NO | Engine 1 Operating Hours Reading for T700 Series Engines |
|  | ENG2_LCF1   | Long Integer | NO | NO | Engine 2 LCF-1 Reading for T700 Series Engines           |
|  | ENG2_LCF2   | Long Integer | NO | NO | Engine 2 LCF-2 Reading for T700 Series Engines           |
|  | ENG2_TTI    | Long Integer | NO | NO | Engine 2 Time/Temp Index Reading for T700 Series Engines |
|  | ENG2_OP_HRS | Long Integer | NO | NO | Engine 2 Operating Hours Reading for T700 Series Engines |
|  | DATE_STAMP  | Date/Time    | NO | NO | Last Transaction Date                                    |
|  | TIME_STAMP  | Date/Time    | NO | NO | Last Transaction Time                                    |
|  | PID_STAMP   | Text         | NO | NO | Last Transaction PID                                     |
|  | DEL_FLAG    | Yes/No       | NO | NO | Logical Delete Flag                                      |

## Entity 'FLIGHT\_CREW'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | FLIGHT_CREW |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                   |
|-----|---------------------|-----------|----------|--------|-------------------------------|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series) |
| PK  | SER_NO              | Text      | YES      | NO     | Aircraft Serial Number        |
| PK  | MSN_DATE            | Date/Time | YES      | NO     | Mission Date                  |
| PK  | FLIGHT_NO           | Byte      | YES      | NO     | Flight Number                 |
| PK  | PID_SEQ             | Byte      | YES      | NO     | PID Sequence Number           |
|     | PID                 | Text      | NO       | NO     | Personal Identifier           |
|     | SSAN                | Text      | NO       | NO     | Social Security Number        |
|     | NAME                | Text      | NO       | NO     | Name of Crew Member           |
|     | RANK                | Text      | NO       | NO     | Rank of Crew Member           |
|     | CREW_DS_1           | Text      | NO       | NO     | Crew Duty Symbol (1)          |
|     | CREW_FS_1           | Text      | NO       | NO     | Crew Flight Symbol (1)        |
|     | CREW_HRS_1          | Single    | NO       | NO     | Crew Hours at Duty (1)        |
|     | CREW_DI_1           | Text      | NO       | NO     | Crew Duty Identifier (1)      |
|     | SEAT_1              | Text      | NO       | NO     | Seat (Front or Back)          |
|     | CREW_DS_2           | Text      | NO       | NO     | Crew Duty Symbol (2)          |
|     | CREW_HRS_2          | Single    | NO       | NO     | Crew Hours at Duty (2)        |
|     | CREW_FS_2           | Text      | NO       | NO     | Crew Flight Symbol (2)        |
|     | CREW_DI_2           | Text      | NO       | NO     | Crew Duty Identifier (2)      |
|     | SEAT_2              | Text      | NO       | NO     | Seat (Front or Back)          |
|     | CREW_DS_3           | Text      | NO       | NO     | Crew Duty Symbol (3)          |
|     | CREW_HRS_3          | Single    | NO       | NO     | Crew Hours at Duty (3)        |
|     | CREW_FS_3           | Text      | NO       | NO     | Crew Flight Symbol (3)        |
|     | CREW_DI_3           | Text      | NO       | NO     | Crew Duty Identifier (3)      |
|     | SEAT_3              | Text      | NO       | NO     | Seat (Front or Back)          |
|     | CREW_DS_4           | Text      | NO       | NO     | Crew Duty Symbol (4)          |
|     | CREW_HRS_4          | Single    | NO       | NO     | Crew Hours at Duty (4)        |
|     | CREW_FS_4           | Text      | NO       | NO     | Crew Flight Symbol (4)        |
|     | CREW_DI_4           | Text      | NO       | NO     | Crew Duty Identifier (4)      |
|     | SEAT_4              | Text      | NO       | NO     | Seat (Front or Back)          |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date         |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time         |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID          |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag           |



## Entity 'FLIGHT\_MISS\_RPT'

|                    |                 |
|--------------------|-----------------|
| <b>Entity name</b> | FLIGHT_MISS_RPT |
| <b>Entity type</b> | independent     |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                   |
|-----|---------------------|-----------|----------|--------|-------------------------------|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series) |
| PK  | SER_NO              | Text      | YES      | NO     | Aircraft Serial Number        |
| PK  | MSN_DATE            | Date/Time | YES      | NO     | Mission Date                  |
| PK  | FLIGHT_NO           | Byte      | YES      | NO     | Flight Number                 |
| PK  | TIME_START          | Text      | YES      | NO     | Time of Mission Start         |
| PK  | PID                 | Text      | YES      | NO     | Personal Identifier           |
|     | TIME_STOP           | Text      | NO       | NO     | Time at Mission Stop          |
|     | FLT_HRS             | Single    | NO       | NO     | Flight Hours                  |
|     | MSN_SYMB            | Text      | NO       | NO     | Mission Symbol                |
|     | WEATHER             | Single    | NO       | NO     |                               |
|     | HOOD                | Single    | NO       | NO     |                               |
|     | NIGHT_VFR           | Single    | NO       | NO     |                               |
|     | NIGHT_GOGGLES       | Single    | NO       | NO     |                               |
|     | NIGHT_SYSTEM        | Single    | NO       | NO     |                               |
|     | DAY_VFR             | Single    | NO       | NO     |                               |
|     | DAY_GOGGLES         | Single    | NO       | NO     |                               |
|     | DAY_SYSTEM          | Single    | NO       | NO     |                               |

## Entity 'FUNCTION\_CODE'

|                    |               |
|--------------------|---------------|
| <b>Entity name</b> | FUNCTION_CODE |
| <b>Entity type</b> | independent   |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description             |
|-----|---------------------|-----------|----------|--------|-------------------------|
| PK  | FUNCTION_CODE       | Text      | YES      | NO     | Function Code           |
|     | FUNCTION_CODE_NARR  | Text      | NO       | NO     | Function Code Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date   |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time   |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID    |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag     |

Entity 'GEN\_2410'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | GEN_2410    |
| <b>Entity type</b> | independent |

**User-defined variables**

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type    | Not null | Unique | Description  |
|-----|---------------------|--------------|----------|--------|--|
| PK  | UIC                 | Text         | YES      | NO     | Unit Identification Code   |
| PK  | CNTRL_NUM           | Text         | YES      | NO     | DA Form 2410 Control Number  |
| PK  | COPY                | Byte         | YES      | NO     | Which copy of 2410 is this record for (1, 2, or 3)                   |
|     | NOMENCLATURE        | Text         | NO       | NO     | Component Nomenclature   |
|     | NSN                 | Text         | NO       | NO     | Component National Stock Number                                      |
|     | PN                  | Text         | NO       | NO     | Component Part Number  |
|     | SN                  | Text         | NO       | NO     | Component Serial Number  |
|     | CAGE                | Text         | NO       | NO     | Contractor and Government Entity (CAGE) code                         |
|     | PREVOH              | Text         | NO       | NO     | Component Number of Previous Overhauls                               |
|     | TSINST              | Long Integer | NO       | NO     | Component Hours Last Installed                                       |
|     | TSNEW               | Long Integer | NO       | NO     | Component Time Since New   |
|     | TSOH                | Text         | NO       | NO     | Component Time Since Overhaul  |
|     | FAIL                | Text         | NO       | NO     | Component Failure Code   |
|     | POSITION            | Text         | NO       | NO     | Component Position Code  |
|     | HSF                 | Long Integer | NO       | NO     | Hot Section Factor   |
|     | METER_HRS           | Long Integer | NO       | NO     | See 341-01 for items that are tracked by Hour Meter.                 |
|     | WUC                 | Text         | NO       | NO     | Component Work Unit Code   |
|     | LCF1                | Long Integer | NO       | NO     | Component LCF1 Reading at Removal                                    |
|     | LCF2                | Long Integer | NO       | NO     | Component LCF2 Reading at Removal                                    |
|     | TTI                 | Long Integer | NO       | NO     | Component TTI Reading at Removal                                     |
|     | OPHRS               | Long Integer | NO       | NO     | Component OPHRS Reading at Removal                                   |
|     | APU_SSN             | Long Integer | NO       | NO     | APU Starts Since New   |
|     | APU_HRS             | Long Integer | NO       | NO     | APU Total Hours  |
|     | APU_SSO             | Long Integer | NO       | NO     | APU Starts Since Overhaul  |
|     | VERSION             | Text         | NO       | NO     | Software Version (If it was software that was removed.)              |
|     | NHA_NOMEN           | Text         | NO       | NO     | Nomen of Next Higher Assembly (NHA)                                  |
|     | NHA_NSN             | Text         | NO       | NO     | NSN of Next Higher Assembly (NHA)                                    |
|     | NHA_PN              | Text         | NO       | NO     | PN of Next Higher Assembly (NHA)                                     |
|     | NHA_SN              | Text         | NO       | NO     | SN of Next Higher Assembly (NHA)                                     |
|     | NHA_HOURS           | Long Integer | NO       | NO     | Hours of Next Higher Assembly (NHA) at removal of component          |
|     | NHA_LCF1            | Long Integer | NO       | NO     | NHA LCF1 Reading at Removal  |
|     | NHA_LCF2            | Long Integer | NO       | NO     | NHA LCF2 Reading at Removal  |
|     | NHA_TTI             | Long Integer | NO       | NO     | NHA TTI Reading at Removal   |
|     | NHA_OPHRS           | Long Integer | NO       | NO     | NHA OPHRS Reading at Removal   |
|     | APU_HR_METER        | Long Integer | NO       | NO     | For -16-1 Apu's that have an Hour Meter (Reading at Time of Removal) |
|     | APU_START_METER     | Long Integer | NO       | NO     | For -16-1 Apu's that have a Start Meter (Reading at Time of Removal) |
|     | HIST_REC_SN         | Text         | NO       | NO     | History Recorder Serial Number of NHA                                |
|     | HIST_LCF1           | Long Integer | NO       | NO     | History Recorder LCF1 Reading at Removal                             |
|     | HIST_LCF2           | Long Integer | NO       | NO     | History Recorder LCF2 Reading at Removal                             |
|     | HIST_TTI            | Long Integer | NO       | NO     | History Recorder TTI Reading at Removal                              |
|     | HIST_OPHRS          | Long Integer | NO       | NO     | History Recorder OPHRS Reading at Removal                            |
|     | MDS                 | Text         | NO       | NO     | Model Aircraft component removed from                                |
|     | SERNO               | Text         | NO       | NO     | Aircraft Serial Number component                                     |

|  |                 |           |    |    |  |
|--|-----------------|-----------|----|----|--|
|  |                 |           |    |    | removed from   |
|  | MAINTLEV        | Text      | NO | NO | Maintenance Level that removed component                     |
|  | REMOVAL_DATE    | Date/Time | NO | NO | Date component was removed from major                        |
|  | MAN_HOURS       | Single    | NO | NO | Man Hours to remove the component.                           |
|  | PID             | Text      | NO | NO | PID of person removing component.                            |
|  | PHONE           | Text      | NO | NO | Telephone Number of UIC                                      |
|  | MALFUNC_EFFECT  | Text      | NO | NO | Malfunction Effect Code                                      |
|  | WHEN_DISC       | Text      | NO | NO | When Discovered Code   |
|  | PRINT_FLAG_2410 | Yes/No    | NO | NO | Has the 2410 been Printed for this component or not          |
|  | REMARKS         | Memo      | NO | NO | Remarks entered at time of removal.                          |
|  | SENT            | Byte      | NO | NO | Has 2410 been sent/Verified (0 = no, 1 = verified, 2 = sent) |
|  | MACHINE_TAG     | Text      | NO | NO | Machine Tag  |
|  | RCODE           | Text      | NO | NO | Reason Code  |
|  | IACD_CD         | Text      | NO | NO | Inspection Action Code                                       |
|  | CONTRACT        | Text      | NO | NO | Contract Number  |
|  | ACT_FCODE       | Text      | NO | NO | Actual Failure code  |
|  | SRA             | Text      | NO | NO | Special Repair Authorization ('Y'/'N')                       |
|  | NEW_NSN         | Text      | NO | NO | New National Stock Number                                    |
|  | NEW_PN          | Text      | NO | NO | New Part Number  |
|  | NEW_SN          | Text      | NO | NO | New Serial Number  |
|  | LOSS_TO         | Text      | NO | NO | Name of activity doing the Loss (DRMO)                       |
|  | LOSS_DT         | Text      | NO | NO | UIC of activity doing the Loss                               |
|  | LOSS_LOC        | Text      | NO | NO | Location of activity doing the Loss                          |
|  | DATE_CHK_SHIP   | Date/Time | NO | NO | Date component was Checked (Copy 2) or Shipped (Copy 3)      |
|  | UIC_ACTION      | Text      | NO | NO | Unit Identification Code for this Action (Copy 2)            |
|  | MAINTLEV_ACTION | Text      | NO | NO | Maintenance Level for this Action (Copy 2)                   |
|  | CORR_COPY       | Yes/No    | NO | NO | Is this a Corrected Copy 2410?                               |
|  | FINALIZED       | Yes/No    | NO | NO | Is this 2410 Finalized? (Used for Copy 2)                    |
|  | DATE_STAMP      | Date/Time | NO | NO | Last Transaction Date  |
|  | TIME_STAMP      | Date/Time | NO | NO | Last Transaction Time  |
|  | PID_STAMP       | Text      | NO | NO | Last Transaction PID   |
|  | DEL_FLAG        | Yes/No    | NO | NO | Logical Delete Flag  |

## Entity 'HOW\_REC'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | HOW_REC     |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description              |
|-----|---------------------|-----------|----------|--------|--------------------------|
| PK  | HOW_REC_CODE        | Text      | YES      | NO     | How Recognized Code      |
|     | HOW_REC_NARR        | Text      | NO       | NO     | How Recognized Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date    |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time    |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID     |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag      |

## Entity 'INSP\_LCF'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | INSP_LCF    |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description   |
|-----|---------------------|-----------|----------|--------|---|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series)                                   |
| PK  | SYS_CODE            | Text      | YES      | NO     | System Code   |
| PK  | INSP_NO             | Integer   | YES      | NO     | Inspection Number   |
|     | WUC                 | Text      | NO       | NO     | Work Unit Code  |
|     | FRQ_TYPE_1          | Text      | NO       | NO     | Frequency Type 1  |
|     | FREQ_1              | Single    | NO       | NO     | First Frequency   |
|     | Tolerance1          | Single    | NO       | NO     | Frequency 1 Tolerance   |
|     | Extension1          | Single    | NO       | NO     | Automatic Extension applied to Frequency 1                      |
|     | FRQ_TYPE_2          | Text      | NO       | NO     | Frequency Type 2  |
|     | FREQ_2              | Single    | NO       | NO     | Second Frequency  |
|     | Tolerance2          | Single    | NO       | NO     | Frequency 2 Tolerance   |
|     | Extension2          | Single    | NO       | NO     | Automatic Extension applied to Frequency 2                      |
|     | NextDueCalc         | Byte      | NO       | NO     | How NextDue is calculated                                       |
|     | AlwaysOn1st         | Yes/No    | NO       | NO     | Is Monthly or Yearly Inspection always due on 1st of the month? |
|     | REF                 | Text      | NO       | NO     | Technical Reference for Inspections                             |
|     | INSP                | Memo      | NO       | NO     | Inspection Narrative  |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date   |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time   |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID  |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag   |

## Entity 'MAINT\_LVL\_LCF'

|                    |               |
|--------------------|---------------|
| <b>Entity name</b> | MAINT_LVL_LCF |
| <b>Entity type</b> | independent   |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                      |
|-----|---------------------|-----------|----------|--------|----------------------------------|
| PK  | MAINT_LEVEL         | Text      | YES      | NO     | Maintenance Level Code           |
|     | MAINT_LEVEL_NARR    | Text      | NO       | NO     | Maintenance Level Code Narrative |
|     | MAJOR LV FLAG       | Yes/No    | NO       | NO     | Is it a major level flag?        |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date            |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time            |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID             |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag              |



## Entity 'MAINTENANCE\_SUMMARY\_REPORT'

|                    |                            |
|--------------------|----------------------------|
| <b>Entity name</b> | MAINTENANCE_SUMMARY_REPORT |
| <b>Entity type</b> | independent                |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                             |
|-----|---------------------|-----------|----------|--------|---|
|     | UIC                 | Text      | NO       | NO     | Unit identifier used as filter criteria |
|     | SER_NO              | Text      | NO       | NO     | FAULT.SER_NO used as filter criteria    |
|     | DATE                | Date/Time | NO       | NO     | FAULT.MSN_DATE used as filter criteria  |
|     | MDS                 | Text      | NO       | NO     | FAULT.MDS                               |
|     | WUC                 | Text      | NO       | NO     | FAULT.WUC                               |
|     | DESCRIPTION         | Text      | NO       | NO     | WUC.WUC_NOMEN                           |
|     | FLIGHTS             | Double    | NO       | NO     | Count of FLIGHT.SER_NO                  |
|     | FLT_HRS             | Single    | NO       | NO     | Sum of FLIGHT.FLT_HRS                   |
|     | STATUS              | Text      | NO       | NO     | FAULT.STATUS                            |
|     | CORR_DATE           | Date/Time | NO       | NO     | FAULT.CORR_DATE                         |
|     | CLOSED              | Yes/No    | NO       | NO     | FAULT.CLOSED                            |
|     | CORRECTIVE_ACTIONS  | Text      | NO       | NO     | FAULT.ACT_CODE                          |
|     | FAULT_MANHOURS      | Single    | NO       | NO     | FAULT.TI_MMH                            |
|     | ACTIONS_MANHOURS    | Single    | NO       | NO     | ACTIONS.MAN_HOURS                       |
|     | RELMAINT_MANHOURS   | Single    | NO       | NO     | REL_MAINT.RM_TI_MMH                     |
|     | RMACTIONS_MANHOURS  | Single    | NO       | NO     | RM_ACTIONS.RM_MAN_HOURS                 |

## Entity 'MAJOR\_NARR'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | MAJOR_NARR  |
| <b>Entity type</b> | independent |

**User-defined variables**

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type | Not null | Unique | Description                   |
|-----|---------------------|-----------|----------|--------|-------------------------------|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series) |
| PK  | SER_NO              | Text      | YES      | NO     | Serial Number                 |
|     | TIME_NARR           | Memo      | NO       | NO     | Time Change Narrative         |
|     | COND_NARR           | Memo      | NO       | NO     | Condition Change Narrative    |

## Entity 'MALFUNC\_EFFECT'

|                    |                |
|--------------------|----------------|
| <b>Entity name</b> | MALFUNC_EFFECT |
| <b>Entity type</b> | independent    |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                  |
|-----|---------------------|-----------|----------|--------|------------------------------|
| PK  | MALFUNC_EFFECT      | Text      | YES      | NO     | Malfunction Effect Code      |
|     | MALFUNC_EFFECT_NARR | Text      | NO       | NO     | Malfunction Effect Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date        |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time        |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID         |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag          |

## Entity 'MSN\_SUFFIX'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | MSN_SUFFIX  |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description              |
|-----|---------------------|-----------|----------|--------|--------------------------|
| PK  | MSN_SUFFIX          | Text      | YES      | NO     | Mission Suffix           |
|     | MSN_SUFFIX_NARR     | Text      | NO       | NO     | Mission Suffix Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date    |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time    |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID     |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag      |

## Alternative keys

|             |                   |
|-------------|-------------------|
| <b>Name</b> | <b>Attributes</b> |
| MSN_SYMBOL  | MSN_SUFFIX        |

## Entity 'MSN\_SYMBOL'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | MSN_SYMBOL  |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description              |
|-----|---------------------|-----------|----------|--------|--------------------------|
| PK  | MSN_SYMBOL          | Text      | YES      | NO     | Mission Symbol           |
|     | MSN_SYMBOL_NARR     | Text      | NO       | NO     | Mission Symbol Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date    |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time    |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID     |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag      |

## Entity 'PARTS\_LCF'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | PARTS_LCF   |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type    | Not null | Unique | Description  |
|-----|---------------------|--------------|----------|--------|--|
| PK  | MDS                 | Text         | YES      | NO     | Model (Mission Design Series)  |
| PK  | WUC                 | Text         | YES      | NO     | Discovery Work Unit Code   |
| PK  | PN                  | Text         | YES      | NO     | Part Number  |
| PK  | CONFIG_CODE         | Byte         | YES      | NO     | Code that Identifies Unique Configurations                             |
|     | PART_NOMEN          | Text         | NO       | NO     | Part Nomenclature  |
|     | NSN                 | Text         | NO       | NO     | NSN  |
|     | CAGE                | Text         | NO       | NO     | Manufacturer of Part   |
|     | ENG_MODEL           | Text         | NO       | NO     | Engine Model   |
|     | QPA                 | Byte         | NO       | NO     | Quantity per Assembly  |
|     | COMP_TYPE           | Text         | NO       | NO     | Component Type (CC, RC, TC, HR)  |
|     | RPT_CYC_D           | Yes/No       | NO       | NO     | Is this Part Have a Reporting Cycle of 'D'                             |
|     | RPT_CYC_E           | Yes/No       | NO       | NO     | Is this Part Have a Reporting Cycle of 'E'                             |
|     | RPT_CYC_F           | Yes/No       | NO       | NO     | Is this Part Have a Reporting Cycle of 'F'                             |
|     | RPT_CYC_G           | Yes/No       | NO       | NO     | Is this Part Have a Reporting Cycle of 'G'                             |
|     | RPT_CYC_I           | Yes/No       | NO       | NO     | Is this Part Have a Reporting Cycle of 'I'                             |
|     | RPT_CYC_J           | Yes/No       | NO       | NO     | Is this Part Have a Reporting Cycle of 'J'                             |
|     | TBO                 | Long Integer | NO       | NO     | Time Between Overhaul/Repair   |
|     | Extension           | Single       | NO       | NO     | Extension for TBO  |
|     | RetirementLife      | Long Integer | NO       | NO     | Maximum operating hours before retirement                              |
|     | UseLowestReplaceDue | Yes/No       | NO       | NO     | True when the lowest subcomponent replacement due value should be used |
|     | WARR_DAYS           | Integer      | NO       | NO     | Warranty Period in Days  |
|     | WARR_HRS            | Long Integer | NO       | NO     | Warranty Period in Aircraft Hours                                      |
|     | AIMIX               | Yes/No       | NO       | NO     | AIMIX Item (Yes/No)  |
|     | REF                 | Text         | NO       | NO     | Source Document Reference  |
|     | NEXT_HIGH_WUC       | Text         | NO       | NO     | WUC of the Next Highest Level Component                                |
|     | AOAP                | Yes/No       | NO       | NO     | Is this part in the -20 Army Oil Analysis Program                      |
|     | SYSTEMCOMPONENT     | Yes/No       | NO       | NO     | Whether the System is in AOAP.   |
|     | DATE_STAMP          | Date/Time    | NO       | NO     | Last Transaction Date  |
|     | TIME_STAMP          | Date/Time    | NO       | NO     | Last Transaction Time  |
|     | PID_STAMP           | Text         | NO       | NO     | Last Transaction PID   |
|     | DEL_FLAG            | Yes/No       | NO       | NO     | Logical Delete Flag  |

Entity 'PRINT\_2410'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | PRINT_2410  |
| <b>Entity type</b> | independent |

**User-defined variables**

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type    | Not null | Unique | Description  |
|-----|---------------------|--------------|----------|--------|--|
| PK  | UIC                 | Text         | YES      | NO     | Unit Identification Code   |
| PK  | CNTRL_NUM           | Text         | YES      | NO     | DA Form 2410 Control Number  |
| PK  | COPY                | Byte         | YES      | NO     | Which copy of 2410 is this record for (1, 2, or 3)                   |
|     | NOMENCLATURE        | Text         | NO       | NO     | Component Nomenclature   |
|     | NSN                 | Text         | NO       | NO     | Component National Stock Number                                      |
|     | PN                  | Text         | NO       | NO     | Component Part Number  |
|     | SN                  | Text         | NO       | NO     | Component Serial Number  |
|     | CAGE                | Text         | NO       | NO     | Contractor and Government Entity (CAGE) code                         |
|     | PREVOH              | Text         | NO       | NO     | Component Number of Previous Overhauls                               |
|     | TSLINST             | Long Integer | NO       | NO     | Component Hours Last Installed                                       |
|     | TSNEW               | Long Integer | NO       | NO     | Component Time Since New   |
|     | TSOH                | Text         | NO       | NO     | Component Time Since Overhaul  |
|     | FAIL                | Text         | NO       | NO     | Component Failure Code   |
|     | POSITION            | Text         | NO       | NO     | Component Position Code  |
|     | HSF                 | Long Integer | NO       | NO     | Hot Section Factor   |
|     | METER_HRS           | Long Integer | NO       | NO     | See 341-01 for items that are tracked by Hour Meter.                 |
|     | WUC                 | Text         | NO       | NO     | Component Work Unit Code   |
|     | LCF1                | Long Integer | NO       | NO     | Component LCF1 Reading at Removal                                    |
|     | LCF2                | Long Integer | NO       | NO     | Component LCF2 Reading at Removal                                    |
|     | TTI                 | Long Integer | NO       | NO     | Component TTI Reading at Removal                                     |
|     | OPHRS               | Long Integer | NO       | NO     | Component OPHRS Reading at Removal                                   |
|     | APU_SSN             | Long Integer | NO       | NO     | APU Starts Since New   |
|     | APU_HRS             | Long Integer | NO       | NO     | APU Total Hours  |
|     | APU_SSO             | Long Integer | NO       | NO     | APU Starts Since Overhaul  |
|     | VERSION             | Text         | NO       | NO     | Software Version (If it was software that was removed.)              |
|     | NHA_NOMEN           | Text         | NO       | NO     | Nomen of Next Higher Assembly (NHA)                                  |
|     | NHA_NSN             | Text         | NO       | NO     | NSN of Next Higher Assembly (NHA)                                    |
|     | NHA_PN              | Text         | NO       | NO     | PN of Next Higher Assembly (NHA)                                     |
|     | NHA_SN              | Text         | NO       | NO     | SN of Next Higher Assembly (NHA)                                     |
|     | NHA_HOURS           | Long Integer | NO       | NO     | Hours of Next Higher Assembly (NHA) at removal of component          |
|     | NHA_LCF1            | Long Integer | NO       | NO     | NHA LCF1 Reading at Removal  |
|     | NHA_LCF2            | Long Integer | NO       | NO     | NHA LCF2 Reading at Removal  |
|     | NHA_TTI             | Long Integer | NO       | NO     | NHA TTI Reading at Removal   |
|     | NHA_OPHRS           | Long Integer | NO       | NO     | NHA OPHRS Reading at Removal   |
|     | APU_HR_METER        | Long Integer | NO       | NO     | For -16-1 APU's that have an Hour Meter (Reading at Time of Removal) |
|     | APU_START_METER     | Long Integer | NO       | NO     | For -16-1 APU's that have a Start Meter (Reading at Time of Removal) |
|     | HIST_REC_SN         | Text         | NO       | NO     | History Recorder Serial Number of NHA                                |
|     | HIST_LCF1           | Long Integer | NO       | NO     | History Recorder LCF1 Reading at Removal                             |
|     | HIST_LCF2           | Long Integer | NO       | NO     | History Recorder LCF2 Reading at Removal                             |
|     | HIST_TTI            | Long Integer | NO       | NO     | History Recorder TTI Reading at Removal                              |
|     | HIST_OPHRS          | Long Integer | NO       | NO     | History Recorder OPHRS Reading at Removal                            |
|     | MDS                 | Text         | NO       | NO     | Model Aircraft component removed from                                |
|     | SERNO               | Text         | NO       | NO     | Aircraft Serial Number component                                     |



|  |                 |           |    |    |  |
|--|-----------------|-----------|----|----|--|
|  |                 |           |    |    | removed from   |
|  | MAINTLEV        | Text      | NO | NO | Maintenance Level that removed component                     |
|  | REMOVAL_DATE    | Date/Time | NO | NO | Date component was removed from major                        |
|  | MAN_HOURS       | Single    | NO | NO | Man Hours to remove the component.                           |
|  | PID             | Text      | NO | NO | PID of person removing component.                            |
|  | PHONE           | Text      | NO | NO | Telephone Number of UIC                                      |
|  | MALFUNC_EFFECT  | Text      | NO | NO | Malfunction Effect Code                                      |
|  | WHEN_DISC       | Text      | NO | NO | When Discovered Code   |
|  | PRINT_FLAG_2410 | Yes/No    | NO | NO | Has the 2410 been Printed for this component or not          |
|  | REMARKS         | Memo      | NO | NO | Remarks entered at time of removal.                          |
|  | SENT            | Byte      | NO | NO | Has 2410 been sent/Verified (0 = no, 1 = verified, 2 = sent) |
|  | MACHINE_TAG     | Text      | NO | NO | Machine Tag  |
|  | RCODE           | Text      | NO | NO | Reason Code  |
|  | IACD_CD         | Text      | NO | NO | Inspection Action Code                                       |
|  | CONTRACT        | Text      | NO | NO | Contract Number  |
|  | ACT_FCODE       | Text      | NO | NO | Actual Failure code  |
|  | SRA             | Text      | NO | NO | Special Repair Authorization ('Y'/'N')                       |
|  | NEW_NSN         | Text      | NO | NO | New National Stock Number                                    |
|  | NEW_PN          | Text      | NO | NO | New Part Number  |
|  | NEW_SN          | Text      | NO | NO | New Serial Number  |
|  | LOSS_TO         | Text      | NO | NO | Name of activity doing the Loss (DRMO)                       |
|  | LOSS_DT         | Text      | NO | NO | UIC of activity doing the Loss                               |
|  | LOSS_LOC        | Text      | NO | NO | Location of activity doing the Loss                          |
|  | DATE_CHK_SHIP   | Date/Time | NO | NO | Date component was Checked (Copy 2) or Shipped (Copy 3)      |
|  | UIC_ACTION      | Text      | NO | NO | Unit Identification Code for this Action (Copy 2)            |
|  | MAINTLEV_ACTION | Text      | NO | NO | Maintenance Level for this Action (Copy 2)                   |
|  | CORR_COPY       | Yes/No    | NO | NO | Is this a Corrected Copy 2410?                               |
|  | FINALIZED       | Yes/No    | NO | NO | Is this 2410 finalized? (used for Copy 2)                    |
|  | DATE_STAMP      | Date/Time | NO | NO | Last Transaction Date  |
|  | TIME_STAMP      | Date/Time | NO | NO | Last Transaction Time  |
|  | PID_STAMP       | Text      | NO | NO | Last Transaction PID   |
|  | DEL_FLAG        | Yes/No    | NO | NO | Logical Delete Flag  |

## Entity 'REL\_MAINT'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | REL_MAINT   |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                           |
|-----|---------------------|-----------|----------|--------|---------------------------------------|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series)         |
| PK  | SER_NO              | Text      | YES      | NO     | Aircraft Serial Number                |
| PK  | SYS_CODE            | Text      | YES      | NO     | System Code                           |
| PK  | FAULT_DATE          | Date/Time | YES      | NO     | Date of Fault                         |
| PK  | FAULT_NO            | Integer   | YES      | NO     | Fault Number                          |
| PK  | RM_SEQ_NO           | Integer   | YES      | NO     | Related Maintenance Sequence Number   |
|     | RM_STATUS           | Text      | NO       | NO     | Related Maintenance Status            |
|     | RM_DATE             | Date/Time | NO       | NO     | Related Maintenance Date              |
|     | RM_TIME             | Date/Time | NO       | NO     | Related Maintenance Time              |
|     | RM_FAULT            | Memo      | NO       | NO     | Related Maintenance Fault Narrative   |
|     | RM_ACTION           | Memo      | NO       | NO     | Related Maintenance Corrective Action |
|     | WO_NO               | Text      | NO       | NO     | Work Order Number                     |
|     | WUC                 | Text      | NO       | NO     | WUC for 2408-13-2                     |
|     | RM_TI_CODE          | Text      | NO       | NO     | Related Maintenance TI Action Code    |
|     | RM_TI_PID           | Text      | NO       | NO     | Technical Inspector PID               |
|     | RM_TI_LVL           | Text      | NO       | NO     | Level of Maintenance of TI            |
|     | RM_TI_MMH           | Single    | NO       | NO     | Technical Inspector Man-Hours         |
|     | RM_CLOSED           | Yes/No    | NO       | NO     |                                       |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date                 |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time                 |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID                  |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag                   |

Entity 'REM\_ENG\_COMPNTS'

|                    |                 |
|--------------------|-----------------|
| <b>Entity name</b> | REM_ENG_COMPNTS |
| <b>Entity type</b> | independent     |

**User-defined variables**

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type    | Not null | Unique | Description   |
|-----|---------------------|--------------|----------|--------|---|
| PK  | MDS                 | Text         | YES      | NO     | Model (Mission Design Series)                                   |
| PK  | SER_NO              | Text         | YES      | NO     | Serial Number   |
| PK  | WUC                 | Text         | YES      | NO     | Discovery Work Unit Code  |
| PK  | CONFIG_CODE         | Byte         | YES      | NO     | Code that Identifies Unique Configurations                      |
| PK  | PN                  | Text         | YES      | NO     | Part Number   |
| PK  | PART_SN             | Text         | YES      | NO     | Part Serial Number  |
| PK  | SEQ_NO              | Byte         | YES      | NO     | Sequence Number   |
|     | LOCATION            | Text         | NO       | NO     | Location of Part Serial Number                                  |
|     | NEXT_HIGH_WUC       | Text         | NO       | NO     | WUC of the Next Highest Level Component                         |
|     | NEXT_HIGH_CONFIG    | Byte         | NO       | NO     | Configuration Code of the Next Highest Level Component          |
|     | NEXT_HIGH_PN        | Text         | NO       | NO     | Part Number of the Next Highest Level Component                 |
|     | NEXT_HIGH_SN        | Text         | NO       | NO     | Serial Number of the Next Highest Level Component               |
|     | LCF1_LN1            | Long Integer | NO       | NO     | LCF-1 Total Counts on Component at Installation                 |
|     | LCF1_LN2            | Long Integer | NO       | NO     | LCF-1 History Recorder Reading at Installation                  |
|     | LCF1_LN3            | Long Integer | NO       | NO     | LCF-1 History Recorder Reading at Removal                       |
|     | LCF1_LN4            | Long Integer | NO       | NO     | LCF-1 Time Since Install (Line 3 minus Line 2)                  |
|     | LCF1_LN5            | Long Integer | NO       | NO     | LCF-1 Total Counts on Component at Removal (Line 4 plus Line 1) |
|     | LCF2_LN1            | Long Integer | NO       | NO     | LCF-2 Total Counts on Component at Installation                 |
|     | LCF2_LN2            | Long Integer | NO       | NO     | LCF-2 History Recorder Reading at Installation                  |
|     | LCF2_LN3            | Long Integer | NO       | NO     | LCF-2 History Recorder Reading at Removal                       |
|     | LCF2_LN4            | Long Integer | NO       | NO     | LCF-2 Time Since Install (Line 3 minus Line 2)                  |
|     | LCF2_LN5            | Long Integer | NO       | NO     | LCF-2 Total Counts on Component at Removal (Line 4 plus Line 1) |
|     | TTI_LN1             | Long Integer | NO       | NO     | TTI Total Counts on Component at Installation                   |
|     | TTI_LN2             | Long Integer | NO       | NO     | TTI History Recorder Reading at Installation                    |
|     | TTI_LN3             | Long Integer | NO       | NO     | TTI History Recorder Reading at Removal                         |
|     | TTI_LN4             | Long Integer | NO       | NO     | TTI Time Since Install (Line 3 minus Line 2)                    |
|     | TTI_LN5             | Long Integer | NO       | NO     | TTI Total Counts on Component at Removal (Line 4 plus Line 1)   |
|     | OPH_LN1             | Long Integer | NO       | NO     | OPHRS Total Counts on Component at Installation                 |
|     | OPH_LN2             | Long Integer | NO       | NO     | OPHRS History Recorder Reading at Installation                  |
|     | OPH_LN3             | Long Integer | NO       | NO     | OPHRS History Recorder Reading at Removal                       |
|     | OPH_LN4             | Long Integer | NO       | NO     | OPHRS Time Since Install (Line 3 minus Line 2)                  |
|     | OPH_LN5             | Long Integer | NO       | NO     | OPHRS Total Counts on Component at Removal (Line 4 plus Line 1) |
|     | REV_NHA_LCF1_INST   | Long Integer | NO       | NO     | Reverse Side NHA LCF1 Inst Component Counts                     |
|     | REV_NHA_LCF2_INST   | Long Integer | NO       | NO     | Reverse Side NHA LCF2 Inst Component Counts                     |
|     | REV_NHA_TTI_INST    | Long Integer | NO       | NO     | Reverse Side NHA TTI Inst Component Counts                      |
|     | REV_NHA_OPHRS_INST  | Long Integer | NO       | NO     | Reverse Side NHA OP Hrs Inst Component Counts                   |

|                       |              |    |    |   |
|-----------------------|--------------|----|----|---|
| REV_NHA_LCF1_RMVL     | Long Integer | NO | NO | Reverse Side NHA LCF1 Rmvl Component Counts       |
| REV_NHA_LCF2_RMVL     | Long Integer | NO | NO | Reverse Side NHA LCF2 Rmvl Component Counts       |
| REV_NHA_TTI_RMVL      | Long Integer | NO | NO | Reverse Side NHA TTI Rmvl Component Counts        |
| REV_NHA_OPHRS_RMVL    | Long Integer | NO | NO | Reverse Side NHA OP Hrs Rmvl Component Counts     |
| REV_SUB_LCF1_INST     | Long Integer | NO | NO | Reverse Side SUB LCF1 Inst Component Counts       |
| REV_SUB_LCF2_INST     | Long Integer | NO | NO | Reverse Side SUB LCF2 Inst Component Counts       |
| REV_SUB_TTI_INST      | Long Integer | NO | NO | Reverse Side SUB TTI Inst Component Counts        |
| REV_SUB_OPHRS_INST    | Long Integer | NO | NO | Reverse Side SUB OP Hrs Inst Component Counts     |
| REPLACE_DUE           | Long Integer | NO | NO | Replacement Due Hours                             |
| RETIREMENT_DUE        | Long Integer | NO | NO | Retirement Due Hours                              |
| HIST_RCDR_SN          | Text         | NO | NO | History Recorder Serial Number                    |
| REMARKS               | Memo         | NO | NO | Significant Historical Data on Part               |
| INSTALL_STATUS        | Text         | NO | NO | Status of Part (Installed/Removed/Cannibalized)   |
| PRINT_FLAG_2410       | Yes/No       | NO | NO | Has a 2410 been Printed?                          |
| DATE_INST             | Date/Time    | NO | NO | Date Part was Installed                           |
| DATE_RMVL             | Date/Time    | NO | NO | Date Part was Removed                             |
| AC_HRS_INST           | Long Integer | NO | NO | Hours on AC at eng component install              |
| AC_HRS_RMVL           | Long Integer | NO | NO | Hours on AC at eng component removal              |
| SERV_CODE             | Text         | NO | NO | Serviceability Code for 2410 Generation           |
| FAIL_CODE             | Text         | NO | NO | Failure Code                                      |
| AOAP                  | Yes/No       | NO | NO | Is this part in the -20 Army Oil Analysis Program |
| CNTRL_NUM             | Text         | NO | NO | 2410 Control Number                               |
| QDR_REPORT_CONTROL_NO | Text         | NO | NO | RCN Generated by QDARS system                     |
| DATE_STAMP            | Date/Time    | NO | NO | Last Transaction Date                             |
| TIME_STAMP            | Date/Time    | NO | NO | Last Transaction Time                             |
| PID_STAMP             | Text         | NO | NO | Last Transaction PID                              |
| DEL_FLAG              | Yes/No       | NO | NO | Logical Delete Flag                               |

## Entity 'REM\_MWO\_COMPNT'

|                    |                |
|--------------------|----------------|
| <b>Entity name</b> | REM_MWO_COMPNT |
| <b>Entity type</b> | independent    |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                                  |
|-----|---------------------|-----------|----------|--------|--|
| PK  | MDS                 | Text      | YES      | NO     | MDS of Aircraft                              |
| PK  | SER_NO              | Text      | YES      | NO     | Serial Number of Aircraft having MWO Applied |
| PK  | WUC                 | Text      | YES      | NO     | Discovery Work Unit Code                     |
| PK  | CONFIG_CODE         | Byte      | YES      | NO     | Code that Identifies Unique Configurations   |
| PK  | PN                  | Text      | YES      | NO     | Part Number                                  |
| PK  | PART_SN             | Text      | YES      | NO     | Part Serial Number                           |
| PK  | LOCATION            | Text      | YES      | NO     | Location of Part Serial Number               |
| PK  | MWO_NUMBER          | Text      | YES      | NO     | MWO Number                                   |
|     | ORG                 | Text      | NO       | NO     | Organization                                 |
|     | PID                 | Text      | NO       | NO     | PID  |
|     | DATE_APLD           | Date/Time | NO       | NO     | Date MWO Applied                             |
|     | MWO_MHRS            | Single    | NO       | NO     | Man-hours to Complete Requirement            |
|     | REMOVE_FLAG         | Yes/No    | NO       | NO     | Is the component removed                     |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date                        |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time                        |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID                         |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag                          |

## Entity 'REMOVED\_COMPONENTS'

|                    |                    |
|--------------------|--------------------|
| <b>Entity name</b> | REMOVED_COMPONENTS |
| <b>Entity type</b> | independent        |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name   | Data type    | Not null | Unique | Description   |
|-----|-----------------------|--------------|----------|--------|---|
| PK  | MDS                   | Text         | YES      | NO     | Model (Mission Design Series)                                       |
| PK  | SER_NO                | Text         | YES      | NO     | Serial Number   |
| PK  | WUC                   | Text         | YES      | NO     | Discovery Work Unit Code  |
| PK  | CONFIG_CODE           | Byte         | YES      | NO     | Code that Identifies Unique Configurations                          |
| PK  | PN                    | Text         | YES      | NO     | Part Number   |
| PK  | PART_SN               | Text         | YES      | NO     | Part Serial Number  |
| PK  | LOCATION              | Text         | YES      | NO     | Location of Part Serial Number                                      |
| PK  | SEQ_NO                | Byte         | YES      | NO     | Unique sequence Number  |
|     | NEXT_HIGH_WUC         | Text         | NO       | NO     | WUC of the Next Highest Level Component                             |
|     | NEXT_HIGH_CONFIG      | Byte         | NO       | NO     | Configuration Code of the Next Highest Level Component              |
|     | NEXT_HIGH_PN          | Text         | NO       | NO     | Part Number of the Next Highest Level Component                     |
|     | NEXT_HIGH_SN          | Text         | NO       | NO     | Serial Number of the Next Highest Level Component                   |
|     | NEXT_HIGH_LOC         | Text         | NO       | NO     | Location of the Next Highest Level Component                        |
|     | NO_OVHLS              | Text         | NO       | NO     | Number of Overhauls   |
|     | N_INST_HRS            | Long Integer | NO       | NO     | Hours on Nomenclature at Installation                               |
|     | N_RMV_L_HRS           | Long Integer | NO       | NO     | Hours on Nomenclature at Removal                                    |
|     | C_INST_HRS            | Long Integer | NO       | NO     | Hours on Component at Installation                                  |
|     | C_RMV_L_HRS           | Long Integer | NO       | NO     | Hours on Component at Removal                                       |
|     | TSOH                  | Text         | NO       | NO     | Time Since Overhaul   |
|     | REPLACE_DUE           | Long Integer | NO       | NO     | Replacement Due Hours   |
|     | RETIREMENT_DUE        | Long Integer | NO       | NO     | Retirement Due Hours  |
|     | REMARKS               | Memo         | NO       | NO     | Significant Historical Data on Part                                 |
|     | INSTALL_STATUS        | Text         | NO       | NO     | Status of Part (Installed/Removed/Cannibalized)                     |
|     | PRINT_FLAG_2410       | Yes/No       | NO       | NO     | Has a 2410 been Printed?  |
|     | DATE_INST             | Date/Time    | NO       | NO     | Date Part was Installed   |
|     | DATE_RMV_L            | Date/Time    | NO       | NO     | Date Part was Removed   |
|     | SERV_CODE             | Text         | NO       | NO     | Serviceability Code for 2410 Generation                             |
|     | FAIL_CODE             | Text         | NO       | NO     | Failure Code  |
|     | AOAP                  | Yes/No       | NO       | NO     | Is this part in the -20 Army Oil Analysis Program                   |
|     | CNTRL_NUM             | Text         | NO       | NO     | 2410 Control Number   |
|     | QDR_REPORT_CONTROL_NO | Text         | NO       | NO     | Report Control Number for Quality Deficiency Report in QDARS system |
|     | DATE_STAMP            | Date/Time    | NO       | NO     | Last Transaction Date   |
|     | TIME_STAMP            | Date/Time    | NO       | NO     | Last Transaction Time   |
|     | PID_STAMP             | Text         | NO       | NO     | Last Transaction PID  |
|     | DEL_FLAG              | Yes/No       | NO       | NO     | Logical Delete Flag   |

## Entity 'RM\_ACTIONS'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | RM_ACTIONS  |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                                 |
|-----|---------------------|-----------|----------|--------|---|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series)               |
| PK  | SER_NO              | Text      | YES      | NO     | Aircraft Serial Number                      |
| PK  | SYS_CODE            | Text      | YES      | NO     | System Code                                 |
| PK  | FAULT_DATE          | Date/Time | YES      | NO     | Date of Fault                               |
| PK  | FAULT_NO            | Integer   | YES      | NO     | Fault Number                                |
| PK  | RM_SEQ_NO           | Integer   | YES      | NO     | Related Maintenance Sequence Number         |
| PK  | RM_ACT_NO           | Integer   | YES      | NO     | Related Maintenance Action Sequence Number  |
|     | RM_ACTION           | Text      | NO       | NO     | Related Maintenance Action Code             |
|     | RM_PID              | Text      | NO       | NO     | Related Maintenance Personal Identification |
|     | RM_LVL_MAINT        | Text      | NO       | NO     | Related Maintenance Level of Maintenance    |
|     | RM_MAN_HOURS        | Single    | NO       | NO     | Related Maintenance Man Hours               |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date                       |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time                       |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID                        |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag                         |



## Entity 'SCH\_INSP'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | SCH_INSP    |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type    | Not null | Unique | Description                                      |
|-----|---------------------|--------------|----------|--------|--|
| PK  | MDS                 | Text         | YES      | NO     | Model (Mission Design Series)                    |
| PK  | SER_NO              | Text         | YES      | NO     | Serial Number                                    |
| PK  | SYS_CODE            | Text         | YES      | NO     | System Code                                      |
| PK  | INSP_NO             | Integer      | YES      | NO     | Inspection Number                                |
|     | INSP_DATE           | Date/Time    | NO       | NO     | Date of Last Inspection                          |
|     | INSP_HOURS          | Single       | NO       | NO     | Aircraft Hours at Last Inspection                |
|     | INSP_RNDS           | Long Integer | NO       | NO     | Number of Rounds at Last Inspection              |
|     | INSP_APU_HOURS      | Single       | NO       | NO     | Number of APU Hours at Last Inspection           |
|     | INSP_APU_STARTS     | Long Integer | NO       | NO     | Number of APU Starts at Last Inspection          |
|     | INSP_CYCLES         | Long Integer | NO       | NO     | Number of Landing Gear Cycles at Last Inspection |
|     | INSP_LANDINGS       | Long Integer | NO       | NO     | Number of Landings at Last Inspection            |
|     | INSP_ENG1_STARTS    | Long Integer | NO       | NO     | Number of starts for engine 1                    |
|     | INSP_ENG2_STARTS    | Long Integer | NO       | NO     | Number of starts for engine 2                    |
|     | INSP_HSF            | Long Integer | NO       | NO     | Hot Section Factor count                         |
|     | NEXT_DUE_DATE       | Date/Time    | NO       | NO     | Next Due Date                                    |
|     | NEXT_DUE_HRS        | Single       | NO       | NO     | Next Due Hours                                   |
|     | NEXT_DUE_VAL        | Single       | NO       | NO     | Next Due Value (rnds,starts)                     |
|     | DAYS_BEFORE_DUE     | Integer      | NO       | NO     | Number of days before inspection is due          |
|     | HOURS_BEFORE_DUE    | Single       | NO       | NO     | Number of hours before inspection is due         |
|     | DATE_STAMP          | Date/Time    | NO       | NO     | Last Transaction Date                            |
|     | TIME_STAMP          | Date/Time    | NO       | NO     | Last Transaction Time                            |
|     | PID_STAMP           | Text         | NO       | NO     | Last Transaction PID                             |
|     | DEL_FLAG            | Yes/No       | NO       | NO     | Logical Delete Flag                              |

## Entity 'SERV\_CODE'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | SERV_CODE   |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description            |
|-----|---------------------|-----------|----------|--------|------------------------|
| PK  | SERVICE_CODE        | Text      | YES      | NO     | Service Code           |
|     | SERV_NARR           | Text      | NO       | NO     | Service Code Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date  |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time  |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID   |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag    |

## Entity 'SERVICING'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | SERVICING   |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                            |
|-----|---------------------|-----------|----------|--------|--|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series)          |
| PK  | SER_NO              | Text      | YES      | NO     | Serial Number                          |
| PK  | MSN_DATE            | Date/Time | YES      | NO     | Mission Date                           |
| PK  | FLIGHT_NO           | Byte      | YES      | NO     | Flight Number                          |
| PK  | SRV_SEQ             | Byte      | YES      | NO     | Service Line Number                    |
|     | FUEL_ADD_LAUX       | Integer   | NO       | NO     | Fuel Added to Left Aux Tank in Pounds  |
|     | FUEL_ADD_FWD        | Integer   | NO       | NO     | Fuel Added to Forward Tank in Pounds   |
|     | FUEL_ADD_CTR        | Integer   | NO       | NO     | Fuel Added to Center Tank in Pounds    |
|     | FUEL_ADD_AFT        | Integer   | NO       | NO     | Fuel Added to Aft Tank in Pounds       |
|     | FUEL_ADD_MAIN       | Integer   | NO       | NO     | Fuel Added to Main Tank in Pounds      |
|     | FUEL_ADD_RAUX       | Integer   | NO       | NO     | Fuel Added to Right Aux Tank in Pounds |
|     | IN_TANK_LAUX        | Integer   | NO       | NO     | Total Fuel in Left Aux Tank in Pounds  |
|     | IN_TANK_FWD         | Integer   | NO       | NO     | Total Fuel in Forward Tank in Pounds   |
|     | IN_TANK_CTR         | Integer   | NO       | NO     | Total Fuel in Center Tank in Pounds    |
|     | IN_TANK_AFT         | Integer   | NO       | NO     | Total Fuel in Aft Tank in Pounds       |
|     | IN_TANK_MAIN        | Integer   | NO       | NO     | Total Fuel in Main Tank in Pounds      |
|     | IN_TANK_RAUX        | Integer   | NO       | NO     | Total Fuel in Right Aux Tank in Pounds |
|     | GRADE_LAUX          | Text      | NO       | NO     | Grade of Fuel Added to Left Aux Tank   |
|     | GRADE_FWD           | Text      | NO       | NO     | Grade of Fuel Added to Forward Tank    |
|     | GRADE_CTR           | Text      | NO       | NO     | Grade of Fuel Added to Center Tank     |
|     | GRADE_AFT           | Text      | NO       | NO     | Grade of Fuel Added to Aft Tank        |
|     | GRADE_MAIN          | Text      | NO       | NO     | Grade of Fuel Added to Main Tank       |
|     | GRADE_RAUX          | Text      | NO       | NO     | Grade of Fuel Added to Right Aux Tank  |
|     | OIL1                | Integer   | NO       | NO     | Amount of Oil Added to Tank 1          |
|     | OIL_GRADE1          | Text      | NO       | NO     | Grade of Oil Added to Tank 1           |
|     | OIL2                | Integer   | NO       | NO     | Amount of Oil Added to Tank 2          |
|     | OIL_GRADE2          | Text      | NO       | NO     | Grade of Oil Added to Tank 2           |
|     | APU_OIL             | Integer   | NO       | NO     | Amount of Oil Added to APU             |
|     | APU_GRADE           | Text      | NO       | NO     | Grade of Oil Added to APU              |
|     | OXYGEN              | Integer   | NO       | NO     | Oxygen Added                           |
|     | ANTI_ICE            | Integer   | NO       | NO     | Anti-Ice Added                         |
|     | SERVICE_PID         | Text      | NO       | NO     | Aircraft Serviced By (Name or PID)     |
|     | SERV_LOC            | Text      | NO       | NO     | Service Location                       |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date                  |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time                  |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID                   |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag                    |

## Entity 'STATUS'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | STATUS      |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description   |
|-----|---------------------|-----------|----------|--------|---|
| PK  | STATUS              | Text      | YES      | NO     | Status Symbols  |
|     | NARRATIVE           | Text      | NO       | NO     | Status Narrative  |
|     | PRIORITY            | Integer   | NO       | NO     | Priority of Status  |
|     | TI_REQD             | Yes/No    | NO       | NO     | TI is required to sign off faults of this status (True/False) |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date   |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time   |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID  |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag   |

Entity 'T700\_LCF'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | T700_LCF    |
| <b>Entity type</b> | independent |

**User-defined variables**

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| <b>Key</b> | <b>Attribute/role name</b> | <b>Data type</b> | <b>Not null</b> | <b>Unique</b> | <b>Description</b>   |
|------------|----------------------------|------------------|-----------------|---------------|----------------------|
| PK         | EN_MODEL                   | Text             | YES             | NO            | Engine Model         |
| PK         | FAT                        | Long Integer     | YES             | NO            | Free Air Temperature |
| PK         | PRESALT                    | Long Integer     | YES             | NO            | Pressure Altitude    |
|            | TBLTGT                     | Long Integer     | NO              | NO            | Table TGT Value      |

## Entity 'TRANS\_CODE'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | TRANS_CODE  |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description           |
|-----|---------------------|-----------|----------|--------|-----------------------|
| PK  | TRANS_CODE          | Text      | YES      | NO     | Transaction Code      |
|     | TRANS_NARR          | Text      | NO       | NO     | Narrative             |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID  |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag   |

## Entity 'UNIT\_LCF'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | UNIT_LCF    |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name     | Data type    | Not null | Unique | Description |
|-----|-------------------------|--------------|----------|--------|-------------|
| PK  | UIC                     | Text         | YES      | NO     |             |
|     | UNIT_DESC               | Text         | NO       | NO     |             |
|     | ORG                     | Text         | NO       | NO     |             |
|     | LOCATION                | Text         | NO       | NO     |             |
|     | PHONE_NO                | Text         | NO       | NO     |             |
|     | TBO_LIMIT               | Integer      | NO       | NO     |             |
|     | TBO_161_LIMIT           | Integer      | NO       | NO     |             |
|     | DAYS_LIMIT              | Integer      | NO       | NO     |             |
|     | HOURS_LIMIT             | Long Integer | NO       | NO     |             |
|     | RNDS_LIMIT              | Long Integer | NO       | NO     |             |
|     | ENG_STARTS_LIMIT        | Integer      | NO       | NO     |             |
|     | APU_START_LIMIT         | Integer      | NO       | NO     |             |
|     | APU_HRS_LIMIT           | Integer      | NO       | NO     |             |
|     | HSF_LIMIT               | Long Integer | NO       | NO     |             |
|     | CYCLES_LIMIT            | Integer      | NO       | NO     |             |
|     | LNDGS_LIMIT             | Integer      | NO       | NO     |             |
|     | PPM_LIMIT               | Integer      | NO       | NO     |             |
|     | PHASE_LIMIT             | Integer      | NO       | NO     |             |
|     | LASTDSRDATE             | Date/Time    | NO       | NO     |             |
|     | LASTDSRTIME             | Date/Time    | NO       | NO     |             |
|     | PRE_OP_HOIST_NARRATIVE  | Text         | NO       | NO     |             |
|     | POST_OP_HOIST_NARRATIVE | Text         | NO       | NO     |             |
|     | DATE_STAMP              | Date/Time    | NO       | NO     |             |
|     | TIME_STAMP              | Date/Time    | NO       | NO     |             |
|     | PID_STAMP               | Text         | NO       | NO     |             |
|     | DEL_FLAG                | Yes/No       | NO       | NO     |             |

## Entity 'UTIL\_LCF'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | UTIL_LCF    |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                |
|-----|---------------------|-----------|----------|--------|----------------------------|
| PK  | UTIL_CODE           | Text      | YES      | NO     | Utilization Code           |
|     | UTIL_NARR           | Text      | NO       | NO     | Utilization Code Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date      |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time      |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID       |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag        |



## Entity 'WHEN\_DISC'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | WHEN_DISC   |
| <b>Entity type</b> | independent |

**User-defined variables**

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type | Not null | Unique | Description               |
|-----|---------------------|-----------|----------|--------|---------------------------|
| PK  | WHEN_DISC           | Text      | YES      | NO     | When Discovered Code      |
|     | WHEN_DISC_NARR      | Text      | NO       | NO     | When Discovered Narrative |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date     |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time     |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID      |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag       |

Entity 'WORK\_ORDERS'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | WORK_ORDERS |
| <b>Entity type</b> | independent |

**User-defined variables**

| <b>Name</b>       | <b>Value</b> |
|-------------------|--------------|
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

**Attributes**

| Key | Attribute/role name | Data type    | Not null | Unique | Description                               |
|-----|---------------------|--------------|----------|--------|---|
| PK  | CNTRL_NO            | Text         | YES      | NO     | Control Number                            |
|     | WO_NO               | Text         | NO       | NO     | Work Order Number                         |
|     | SHOP_CODE           | Text         | NO       | NO     | Shop Code of Work Order                   |
|     | EIC                 | Text         | NO       | NO     | End Item Code                             |
|     | PRIORITY            | Byte         | NO       | NO     | Priority                                  |
|     | PRI_PID             | Text         | NO       | NO     | Priority Authorization PID                |
|     | TYPE                | Text         | NO       | NO     | Type of 2407<br>(Request,MWO,Warranty)    |
|     | REQ_UIC             | Text         | NO       | NO     | Requesting Unit                           |
|     | EQ_SER_NO           | Text         | NO       | NO     | Equipment Serial Number                   |
|     | EQ_NOMEN            | Text         | NO       | NO     | Equipment Nomenclature                    |
|     | MDS                 | Text         | NO       | NO     | Model (Mission Design Series) of Aircraft |
|     | SER_NO              | Text         | NO       | NO     | Serial Number of Aircraft                 |
|     | LINE_NO             | Text         | NO       | NO     | Line Number                               |
|     | EQ_NSN              | Text         | NO       | NO     | Equipment National Stock Number           |
|     | MNT_ACT             | Text         | NO       | NO     | Maintenance Activity                      |
|     | MNT_LVL             | Text         | NO       | NO     | Maintenance Level (O,F,D)                 |
|     | UTIL_CODE           | Text         | NO       | NO     | Utilization Code                          |
|     | MSCR_ITEM           | Yes/No       | NO       | NO     | MSCR Item                                 |
|     | ERC                 | Text         | NO       | NO     | Equipment Readiness Code                  |
|     | PACING              | Text         | NO       | NO     | Pacing Item Code                          |
|     | HOURS               | Single       | NO       | NO     | Operating Hours                           |
|     | MILES               | Integer      | NO       | NO     | Miles                                     |
|     | ROUNDS              | Long Integer | NO       | NO     | Rounds                                    |
|     | APU_STARTS          | Long Integer | NO       | NO     | APU Starts                                |
|     | WHEN_DISC           | Text         | NO       | NO     | When Discovered Code                      |
|     | HOW_REC             | Text         | NO       | NO     | How Recognized Code                       |
|     | DESCRIPTION         | Memo         | NO       | NO     | Description                               |
|     | REMARKS             | Memo         | NO       | NO     | Remarks                                   |
|     | REP_UIC             | Text         | NO       | NO     | Repair Unit                               |
|     | REP_ORG             | Text         | NO       | NO     | Repair Organization                       |
|     | REP_LOC             | Text         | NO       | NO     | Repair Location                           |
|     | ORG_TYPE            | Text         | NO       | NO     | Organization Type (1,2,3)                 |
|     | AMS_CODE            | Text         | NO       | NO     | AMS Account Code                          |
|     | TOT_MH_COST         | Single       | NO       | NO     | Total Man-hour Cost                       |
|     | DELAY               | Text         | NO       | NO     | Delay Code (0-5)                          |
|     | TRANSCRIBED         | Yes/No       | NO       | NO     | Data Transcribed                          |
|     | SUB_BY              | Text         | NO       | NO     | Submitted by                              |
|     | SUB_DT              | Date/Time    | NO       | NO     | Date Submitted                            |
|     | REC_BY              | Text         | NO       | NO     | Received by                               |
|     | REC_DT              | Date/Time    | NO       | NO     | Date Received                             |
|     | WS_BY               | Text         | NO       | NO     | Work Started by                           |
|     | WS_DT               | Date/Time    | NO       | NO     | Date Work Started                         |
|     | INSP_BY             | Text         | NO       | NO     | Inspected by                              |
|     | INSP_DT             | Date/Time    | NO       | NO     | Date Inspected                            |
|     | ACPT_BY             | Text         | NO       | NO     | Accepted by                               |
|     | ACPT_DT             | Date/Time    | NO       | NO     | Date Accepted                             |
|     | DISP                | Text         | NO       | NO     | Disposition Code (A,B,C,D,E)              |
|     | MWO_NUMBER          | Text         | NO       | NO     | MWO Number                                |
|     | SYS_CODE            | Text         | NO       | NO     | System Code -- for Fault reference        |
|     | FAULT_DATE          | Date/Time    | NO       | NO     | Date of Fault -- for Fault reference      |
|     | FAULT_NO            | Integer      | NO       | NO     | Fault Number -- for Fault reference       |
|     | RM_SEQ_NO           | Integer      | NO       | NO     | Related Maintenance Sequence              |

|  |             |           |    |    |   |
|--|-------------|-----------|----|----|---|
|  |             |           |    |    | Number -- for Fault reference                                       |
|  | WUC         | Text      | NO | NO | Component Work Unit Code -- for Component reference                 |
|  | CONFIG_CODE | Byte      | NO | NO | Component Config Code -- for Component reference                    |
|  | PN          | Text      | NO | NO | Component Part Number -- for Component reference                    |
|  | PART_SN     | Text      | NO | NO | Component Part Serial Number -- for Component reference             |
|  | LOCATION    | Text      | NO | NO | Component Location of Part Serial Number -- for Component reference |
|  | CLOSED      | Yes/No    | NO | NO | Is Work Order Closed?   |
|  | DATE_STAMP  | Date/Time | NO | NO | Last Transaction Date   |
|  | TIME_STAMP  | Date/Time | NO | NO | Last Transaction Time   |
|  | PID_STAMP   | Text      | NO | NO | Last Transaction PID  |
|  | DEL_FLAG    | Yes/No    | NO | NO | Logical Delete Flag   |

## Entity 'WUC'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | WUC         |
| <b>Entity type</b> | independent |

## User-defined variables

|                   |              |
|-------------------|--------------|
| <b>Name</b>       | <b>Value</b> |
| Linked table      | No           |
| Connect           |              |
| Source Table Name |              |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                               |
|-----|---------------------|-----------|----------|--------|---|
| PK  | MDS                 | Text      | YES      | NO     | Model (Mission Design Series)             |
| PK  | WUC                 | Text      | YES      | NO     | Work Unit Code                            |
|     | WUC_NOMEN           | Text      | NO       | NO     | Work Unit Code Nomenclature               |
|     | NEXT_HIGH_WUC       | Text      | NO       | NO     | Identifies Next Highest WUC for this Part |
|     | FUNC_GROUP          | Yes/No    | NO       | NO     | Is this WUC a Functional Group ?          |
|     | DATE_STAMP          | Date/Time | NO       | NO     | Last Transaction Date                     |
|     | TIME_STAMP          | Date/Time | NO       | NO     | Last Transaction Time                     |
|     | PID_STAMP           | Text      | NO       | NO     | Last Transaction PID                      |
|     | DEL_FLAG            | Yes/No    | NO       | NO     | Logical Delete Flag                       |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
03086

Table Name: AUDIT\_DELINS

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE |          | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |                 |           |            |               |
| TABLE_NAME |          | VARCHAR2 | 30    |     | NOT NULL | NAME OF TABLE TO AUDIT                                   | alpha_num_check |           |            |               |
| PRM_KEY    |          | VARCHAR2 | 200   |     | NOT NULL | PRIMARY KEY VALUE  |                 |           |            |               |
| DML        |          | VARCHAR2 | 6     |     | NOT NULL | TYPE OF DML STATEMENT THAT CHANGED DATA                  | check const     |           |            |               |
| WHEN_DML   |          | DATE     |       |     | NOT NULL | DATE AND TIME OF THE DML STATEMENT THAT CHANGED THE DATA | in_the_past     |           |            |               |
| USERNAME   |          | VARCHAR2 | 30    |     | NULL     | USERNAME THAT ISSUED DML STATEMENT THAT CHANGED THE DATA | alpha_num_check |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
03086

Table Name: AUDIT\_STATUS

| Col Name     | FrnTable | Type     | Width | Dec | Null/Not | Comment                              | Validation      | Ref Table | Ref Column | Column Format |
|--------------|----------|----------|-------|-----|----------|--------------------------------------|-----------------|-----------|------------|---------------|
| TEST_PHASE   |          | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                           |                 |           |            |               |
| MASTER_NAME  |          | VARCHAR2 | 30    |     | NOT NULL | MASTER TABLE NAME                    | check const     |           |            |               |
| PRM_KEY      |          | VARCHAR2 | 200   |     | NOT NULL | PRIMARY KEY VALUE                    |                 |           |            |               |
| AUDIT_BEG    |          | DATE     |       |     | NOT NULL | BEGIN DATE AND TIME OF<br>AUDITING   | in_the_past     |           |            |               |
| AUDIT_END    |          | DATE     |       |     | NULL     | END DATE AND TIME OF<br>AUDITING     | in_the_past     |           |            |               |
| USERNAME_OFF |          | VARCHAR2 | 30    |     | NULL     | USERNAME THAT TURNED<br>AUDITING OFF | alpha_num_check |           |            |               |
| USERNAME_ON  |          | VARCHAR2 | 30    |     | NULL     | USERNAME THAT TURNED<br>AUDITING ON  | alpha_num_check |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
03086

Table Name: AUDIT\_UPD\_CHAR

| Col Name    | FmTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|-------------|---------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE  |         | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |                 |           |            |               |
| TABLE_NAME  |         | VARCHAR2 | 30    |     | NOT NULL | NAME OF TABLE TO AUDIT   | alpha_num_check |           |            |               |
| PRM_KEY     |         | VARCHAR2 | 200   |     | NOT NULL | PRIMARY KEY VALUE  |                 |           |            |               |
| COLUMN_NAME |         | VARCHAR2 | 15    |     | NOT NULL | COLUMN NAME  |                 |           |            |               |
| WHEN_DML    |         | DATE     |       |     | NOT NULL | DATE AND TIME OF THE DML<br>STATEMENT THAT CHANGED THE<br>DATA | in_the_past     |           |            |               |
| NEW_VALUE   |         | VARCHAR2 | 4000  |     | NULL     | DATA VALUE POST-UPDATE   |                 |           |            |               |
| OLD_VALUE   |         | VARCHAR2 | 4000  |     | NULL     | DATA VALUE PRE-UPDATE  |                 |           |            |               |
| USERNAME    |         | VARCHAR2 | 30    |     | NULL     | USERNAME THAT ISSUED DML<br>STATEMENT THAT CHANGED THE<br>DATA | alpha_num_check |           |            |               |



## UniRAM Data Dictionary

Report Date: 27-MAR-03  
03086

Table Name: AUDIT\_UPD\_DATE

| Col Name    | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|-------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE  |          | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |                 |           |            |               |
| TABLE_NAME  |          | VARCHAR2 | 30    |     | NOT NULL | NAME OF TABLE TO AUDIT                                   | alpha_num_check |           |            |               |
| PRM_KEY     |          | VARCHAR2 | 200   |     | NOT NULL | PRIMARY KEY VALUE  |                 |           |            |               |
| COLUMN_NAME |          | VARCHAR2 | 15    |     | NOT NULL | COLUMN NAME  |                 |           |            |               |
| WHEN_DML    |          | DATE     |       |     | NOT NULL | DATE AND TIME OF THE DML STATEMENT THAT CHANGED THE DATA | in_the_past     |           |            |               |
| NEW_VALUE   |          | DATE     |       |     | NULL     | DATA VALUE POST-UPDATE                                   |                 |           |            |               |
| OLD_VALUE   |          | DATE     |       |     | NULL     | DATA VALUE PRE-UPDATE                                    |                 |           |            |               |
| USERNAME    |          | VARCHAR2 | 30    |     | NULL     | USERNAME THAT ISSUED DML STATEMENT THAT CHANGED THE DATA | alpha_num_check |           |            |               |

## UniRAM Data Dictionary

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Table Name: AUDIT\_UPD\_NUM

| Col Name    | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|-------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE  |          | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |                 |           |            |               |
| TABLE_NAME  |          | VARCHAR2 | 30    |     | NOT NULL | NAME OF TABLE TO AUDIT   | alpha_num_check |           |            |               |
| PRM_KEY     |          | VARCHAR2 | 200   |     | NOT NULL | PRIMARY KEY VALUE  |                 |           |            |               |
| COLUMN_NAME |          | VARCHAR2 | 15    |     | NOT NULL | COLUMN NAME  |                 |           |            |               |
| WHEN_DML    |          | DATE     |       |     | NOT NULL | DATE AND TIME OF THE DML<br>STATEMENT THAT CHANGED THE<br>DATA | in_the_past     |           |            |               |
| NEW_VALUE   |          | NUMBER   |       |     | NULL     | DATA VALUE POST-UPDATE   |                 |           |            |               |
| OLD_VALUE   |          | NUMBER   |       |     | NULL     | DATA VALUE PRE-UPDATE  |                 |           |            |               |
| USERNAME    |          | VARCHAR2 | 30    |     | NULL     | USERNAME THAT ISSUED DML<br>STATEMENT THAT CHANGED THE<br>DATA | alpha_num_check |           |            |               |

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Table Name: AVAIL

| Col Name   | FmTable  | Type     | Width | Dec | Null/Not | Comment   | Validation   | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|--------------|-----------|------------|---------------|
| TEST_PHASE | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  | test_lookup  | TEST      | TEST_PHASE |               |
| EI_MODEL   | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                   |              |           |            |               |
| EI_ID      | CNTLLOG  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER        |              |           |            |               |
| CN_AVL     | CNTLLOG  | VARCHAR2 | 12    |     | NOT NULL | AVAILABILITY EVENT CONTROL NUMBER                 | validate_cn  |           |            |               |
| EI_SN      | VARCHAR2 | VARCHAR2 | 25    |     | NULL     | END ITEM SERIAL NUMBER                            | model_lookup | ENDITEM   | EI_SN      |               |
| EI_TYP     | VARCHAR2 | VARCHAR2 | 3     |     | NULL     | TYPE OF END ITEM I.E. AIRCRAFT, SUPPORT EQUIPMENT | model_lookup | MODEL     | EI_TYP     |               |
| UIC_OWN    | VARCHAR2 | VARCHAR2 | 6     |     | NULL     | OWNING UIC  | model_lookup | EIDETL    | UIC_OWN    |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: AVLDETL

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation  | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE | AVAIL    | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                       |             |           |            |               |
| EI_MODEL   | AVAIL    | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800               |             |           |            |               |
| EI_ID      | AVAIL    | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER    |             |           |            |               |
| CN_AVL     | AVAIL    | VARCHAR2 | 12    |     | NOT NULL | AVAILABILITY EVENT CONTROL<br>NUMBER             |             |           |            |               |
| SEQ_NO     |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                                  |             |           |            | 90.9          |
| AVL_BEG    |          | DATE     | 9     |     | NULL     | BEGIN DATE AND TIME OF THE<br>AVAILABILITY EVENT | in_the_past |           |            | YYDDDDHH24MI  |
| AVL_END    |          | DATE     | 9     |     | NULL     | END DATE AND TIME OF THE<br>AVAILABILITY EVENT   | in_the_past |           |            | YYDDDDHH24MI  |
| CN_REF     |          | VARCHAR2 | 12    |     | NULL     | RELATED EVENT CONTROL NUMBER                     | validate_cn |           |            |               |
| LOC        |          | VARCHAR2 | 4     |     | NULL     | LOCATION OF EVENT<br>ORIGINATION                 | lcf_lookup  | LCFCODES  | CODE       |               |
| RED_EI     |          | VARCHAR2 | 1     |     | NULL     | END ITEM READINESS FOR THIS<br>TIME PERIOD       | lcf_lookup  | LCFCODES  | CODE       |               |
| STAT_EI    |          | VARCHAR2 | 1     |     | NULL     | END ITEM STATUS FOR THIS<br>TIME PERIOD          | lcf_lookup  | LCFCODES  | CODE       |               |
| TEXT       |          | VARCHAR2 | 2000  |     | NULL     | NARRATIVE TEXT                                   |             |           |            |               |

## UniRAM Data Dictionary

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Table Name: CNTILLOG

| Col Name      | FmtTable | Type     | Width | Dec | Null/Not | Comment   | Validation   | Ref Table | Ref Column | Column Format |
|---------------|----------|----------|-------|-----|----------|---|--------------|-----------|------------|---------------|
| TEST_PHASE    | ENDITEM  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  | test_lookup  | TEST      | TEST_PHASE |               |
| EI_MODEL      | ENDITEM  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                   |              |           |            |               |
| EI_ID         | ENDITEM  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER        |              |           |            |               |
| CN            |          | VARCHAR2 | 12    |     | NOT NULL | EVENT CONTROL NUMBER                              | validate_cn  |           |            |               |
| AUDIT_EVTN    |          | VARCHAR2 | 1     |     | NULL     | AUDITING TURNED ON                                | check const  |           |            |               |
| EI_BEG_AGE    |          | NUMBER   | 6     | 1   | NULL     | END ITEM AGE WHEN EVENT STARTED                   |              |           |            | 9990.9        |
| EI_SN         |          | VARCHAR2 | 25    |     | NULL     | END ITEM SERIAL NUMBER                            | model_lookup | ENDITEM   | EI_SN      |               |
| EI_TYP        |          | VARCHAR2 | 3     |     | NULL     | TYPE OF END ITEM I.E. AIRCRAFT, SUPPORT EQUIPMENT | model_lookup | MODEL     | EI_TYP     |               |
| EVNT_CLASS    |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                      | check const  |           |            |               |
| EVNT_CLOSED   |          | VARCHAR2 | 1     |     | NULL     | EVENT IS CLOSED                                   | check const  |           |            |               |
| EVNT_COMPLETE |          | VARCHAR2 | 1     |     | NULL     | EVENT IS COMPLETELY ENTERED                       | check const  |           |            |               |
| EVNT_STAT01   |          | VARCHAR2 | 1     |     | NULL     | STATUS 01 = LAST LEVEL 2 EDIT THAT WAS EXECUTED   | check const  |           |            |               |
| EVNT_STAT02   |          | VARCHAR2 | 1     |     | NULL     | STATUS 02 = SUCCESSFUL/UNSUCCESSFUL L2 EDIT       | check const  |           |            |               |
| EVNT_STAT03   |          | NUMBER   | 2     | 0   | NULL     | STATUS 03 = NUMBER OF LEVEL 2A EDIT CYCLES        |              |           |            | 90            |
| EVNT_STAT04   |          | VARCHAR2 | 1     |     | NULL     | STATUS 04 = PRINTED FOR SCORING CONFERENCE?       | lcf_lookup   | LCFCODES  | CODE       |               |
| EVNT_STAT05   |          | VARCHAR2 | 1     |     | NULL     | STATUS 05 = CURRENTLY UNUSED                      | lcf_lookup   | LCFCODES  | CODE       |               |
| EVNT_STAT06   |          | VARCHAR2 | 1     |     | NULL     | STATUS 06 = CURRENTLY UNUSED                      | lcf_lookup   | LCFCODES  | CODE       |               |
| EVNT_STAT07   |          | VARCHAR2 | 1     |     | NULL     | STATUS 07 = CURRENTLY UNUSED                      | lcf_lookup   | LCFCODES  | CODE       |               |
| EVNT_STAT08   |          | VARCHAR2 | 1     |     | NULL     | STATUS 08 = CURRENTLY UNUSED                      | lcf_lookup   | LCFCODES  | CODE       |               |
| EVNT_STAT09   |          | VARCHAR2 | 1     |     | NULL     | STATUS 09 = CURRENTLY UNUSED                      | lcf_lookup   | LCFCODES  | CODE       |               |
| EVNT_STAT10   |          | VARCHAR2 | 1     |     | NULL     | STATUS 10 = CURRENTLY UNUSED                      | lcf_lookup   | LCFCODES  | CODE       |               |
| MODULE_A      |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF AVAILABILITY LINES THIS EVENT           |              |           |            | 90            |
| MODULE_ED     |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF APU/ENGINE DETAIL RUNS USED THIS EVENT  |              |           |            | 90            |
| MODULE_ES     |          | NUMBER   | 1     | 0   | NULL     | NUMBER OF APU/ENGINE SUMMARY RUNS USED THIS EVENT |              |           |            | 0             |
| MODULE_MA     |          | NUMBER   | 3     | 0   | NULL     | NUMBER OF ACTIONS USED THIS EVENT                 |              |           |            | 990           |
| MODULE_MM     |          | NUMBER   | 1     | 0   | NULL     | NUMBER OF MONITORINGS USED THIS EVENT             |              |           |            | 0             |
| MODULE_MT     |          | NUMBER   | 3     | 0   | NULL     | NUMBER OF TASKS USED THIS EVENT                   |              |           |            | 990           |
| MODULE_OA     |          | NUMBER   | 3     | 0   | NULL     | NUMBER OF ACTIVITIES USED THIS EVENT              |              |           |            | 990           |
| MODULE_OC     |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF CONFIGURATIONS USED THIS EVENT          |              |           |            | 90            |

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Table Name: CNTLLOG

| Col Name  | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation   | Ref Table | Ref Column | Column Format |
|-----------|----------|----------|-------|-----|----------|---|--------------|-----------|------------|---------------|
| MODULE_OL |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF LOADS USED THIS<br>EVENT USED             |              |           |            | 90            |
| MODULE_OW |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF WEAPON/AMMOS USED<br>THIS EVENT           |              |           |            | 90            |
| MODULE_P  |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF PART UTILIZATIONS<br>USED THIS EVENT      |              |           |            | 90            |
| MODULE_Q  |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF EQUIPMENT/TOOLS<br>USED THIS EVENT        |              |           |            | 90            |
| MODULE_R  |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF READINGS USED THIS<br>EVENT               |              |           |            | 90            |
| MODULE_X  |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF<br>EXPENDABLE/SERVICES USED<br>THIS EVENT |              |           |            | 90            |
| TEXT1     |          | VARCHAR2 | 4000  |     | NULL     | EVENT DESCRIPTION                                   |              |           |            |               |
| TEXT2     |          | VARCHAR2 | 4000  |     | NULL     | FAULT CORRECTION                                    |              |           |            |               |
| UIC_OWN   |          | VARCHAR2 | 6     |     | NULL     | OWNING UIC  | model_lookup | EIDETL    | UIC_OWN    |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: COLUSAGE

| Col Name      | FrnTable | Type     | Width | Dec | Null/Not | Comment                                  | Validation  | Ref Table | Ref Column | Column Format |
|---------------|----------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE    | TEST     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                               |             |           |            |               |
| MODULE_SEQ    |          | NUMBER   |       |     | NOT NULL | MODULE SEQUENCE NUMBER                   |             |           |            |               |
| MODULE_NAME   |          | VARCHAR2 | 2     |     | NOT NULL | TABLE/MODULE NAME                        |             |           |            |               |
| COLUMN_NAME   |          | VARCHAR2 | 15    |     | NOT NULL | COLUMN/FIELD NAME                        |             |           |            |               |
| CHANGED_ITM   |          | VARCHAR2 | 1     |     | NULL     | FIELD HAS CHANGED PRIOR CUSTOMIZATION    | check const |           |            |               |
| CUSTOM_USAGE  |          | VARCHAR2 | 4     |     | NULL     | HOW COLUMN/FIELD IS USED                 | sys_lookup  | SYSCODES  | CODE       |               |
| DEF_VALUE     |          | VARCHAR2 | 20    |     | NULL     | DEFAULT VALUE FOR RANGE CHECK            |             |           |            |               |
| FLD_SEQ       |          | NUMBER   |       |     | NULL     | FIELD SEQUENCE ORDER                     |             |           |            |               |
| GENERIC_USAGE |          | VARCHAR2 | 4     |     | NULL     | FIELD USAGE IN GENERIC UNIRAM            | sys_lookup  | SYSCODES  | CODE       |               |
| MAX_VALUE     |          | VARCHAR2 | 20    |     | NULL     | MAXIMUM VALUE FOR RANGE CHECK            |             |           |            |               |
| MIN_VALUE     |          | VARCHAR2 | 20    |     | NULL     | MINIMUM VALUE FOR RANGE CHECK            |             |           |            |               |
| MODULE_USAGE  |          | VARCHAR2 | 4     |     | NULL     | FIELD USAGE AFTER USED MODULES SPECIFIED | sys_lookup  | SYSCODES  | CODE       |               |
| TABLE_NAME    |          | VARCHAR2 | 30    |     | NULL     | TABLE NAME                               |             |           |            |               |

## UnIRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: COMPUTATION

| Col Name | FrnTable | Type   | Width | Dec | Null/Not | Comment              | Validation | Ref Table | Ref Column | Column Format |
|----------|----------|--------|-------|-----|----------|----------------------|------------|-----------|------------|---------------|
| DT01     |          | DATE   |       |     | NULL     | DATETIME COLUMN      |            |           |            |               |
| DT02     |          | DATE   |       |     | NULL     | D<br>DATETIME COLUMN |            |           |            |               |
| DT03     |          | DATE   |       |     | NULL     | D<br>DATETIME COLUMN |            |           |            |               |
| DT04     |          | DATE   |       |     | NULL     | D<br>DATETIME COLUMN |            |           |            |               |
| DT05     |          | DATE   |       |     | NULL     | D<br>DATETIME COLUMN |            |           |            |               |
| DT06     |          | DATE   |       |     | NULL     | D<br>DATETIME COLUMN |            |           |            |               |
| DT07     |          | DATE   |       |     | NULL     | D<br>DATETIME COLUMN |            |           |            |               |
| DT08     |          | DATE   |       |     | NULL     | D<br>DATETIME COLUMN |            |           |            |               |
| DT09     |          | DATE   |       |     | NULL     | D<br>DATETIME COLUMN |            |           |            |               |
| NUM01    |          | NUMBER |       |     | NULL     | D<br>NUMERIC COLUMN  |            |           |            |               |
| NUM02    |          | NUMBER |       |     | NULL     | N<br>NUMERIC COLUMN  |            |           |            |               |
| NUM03    |          | NUMBER |       |     | NULL     | N<br>NUMERIC COLUMN  |            |           |            |               |
| NUM04    |          | NUMBER |       |     | NULL     | N<br>NUMERIC COLUMN  |            |           |            |               |
| NUM05    |          | NUMBER |       |     | NULL     | N<br>NUMERIC COLUMN  |            |           |            |               |
| NUM06    |          | NUMBER |       |     | NULL     | N<br>NUMERIC COLUMN  |            |           |            |               |
| NUM07    |          | NUMBER |       |     | NULL     | N<br>NUMERIC COLUMN  |            |           |            |               |
| NUM08    |          | NUMBER |       |     | NULL     | N<br>NUMERIC COLUMN  |            |           |            |               |
| NUM09    |          | NUMBER |       |     | NULL     | N<br>NUMERIC COLUMN  |            |           |            |               |



## Table Name: COMPUTATION

| Col Name | FrnTable | Type     | Width | Dec | Null/Not | Comment               | Validation | Ref Table | Ref Column | Column Format |
|----------|----------|----------|-------|-----|----------|-----------------------|------------|-----------|------------|---------------|
| NUM10    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM11    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM12    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM13    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM14    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM15    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM16    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM17    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM18    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM19    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| NUM20    |          | NUMBER   |       |     | NULL     | NUMERIC COLUMN<br>N   |            |           |            |               |
| USERNAME |          | VARCHAR2 | 30    |     | NULL     | ORACLE USER NAME<br>N |            |           |            |               |
| VC01     |          | VARCHAR2 | 500   |     | NULL     | CHARACTER COLUMN<br>U |            |           |            |               |
| VC02     |          | VARCHAR2 | 500   |     | NULL     | CHARACTER COLUMN<br>V |            |           |            |               |
| VC03     |          | VARCHAR2 | 500   |     | NULL     | CHARACTER COLUMN<br>V |            |           |            |               |
| VC04     |          | VARCHAR2 | 500   |     | NULL     | CHARACTER COLUMN<br>V |            |           |            |               |
| VC05     |          | VARCHAR2 | 500   |     | NULL     | CHARACTER COLUMN<br>V |            |           |            |               |

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Table Name: COMPUTATION

| Col Name | FrnTable | Type     | Width | Dec | Null/Not | Comment          | Validation | Ref Table | Ref Column | Column Format |
|----------|----------|----------|-------|-----|----------|------------------|------------|-----------|------------|---------------|
| VC06     |          | VARCHAR2 | 500   |     | NULL     | CHARACTER COLUMN | V          |           |            |               |
| VC07     |          | VARCHAR2 | 500   |     | NULL     | CHARACTER COLUMN | V          |           |            |               |
| VC08     |          | VARCHAR2 | 500   |     | NULL     | CHARACTER COLUMN | V          |           |            |               |
| VC09     |          | VARCHAR2 | 500   |     | NULL     | CHARACTER COLUMN | V          |           |            |               |
|          |          |          |       |     |          |                  | V          |           |            |               |

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Table Name: DATADICT

| Col Name      | FmTable | Type     | Width | Dec | Null/Not | Comment   | Validation | Ref Table | Ref Column | Column Format |
|---------------|---------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| TABLE_NAME    |         | VARCHAR2 | 30    |     | NOT NULL | TABLE NAME                                      |            |           |            |               |
| COLUMN_NAME   |         | VARCHAR2 | 16    |     | NOT NULL | COLUMN NAME                                     |            |           |            |               |
| COLUMN_FORMAT |         | VARCHAR2 | 20    |     | NULL     | COLUMN FORMAT                                   |            |           |            |               |
| COMMENTS      |         | VARCHAR2 | 2000  |     | NULL     | COLUMN COMMENTS                                 |            |           |            |               |
| DATA_TYPE     |         | VARCHAR2 | 9     |     | NULL     | COLUMN DATATYPE                                 |            |           |            |               |
| DECIMAL_WIDTH |         | NUMBER   | 1     |     | NULL     | DECIMAL WIDTH                                   |            |           |            | 0             |
| FRNKEY_TABLE  |         | VARCHAR2 | 12    |     | NULL     | FOREIGN KEY TABLE                               |            |           |            |               |
| LOOKUP        |         | VARCHAR2 | 16    |     | NULL     | LEVEL 1 LOOKUP VALIDATION                       |            |           |            |               |
| REF_COLUMN    |         | VARCHAR2 | 15    |     | NULL     | REFERENCE COLUMN FOR LEVEL 1                    |            |           |            |               |
| REF_TABLE     |         | VARCHAR2 | 8     |     | NULL     | LOOKUP  |            |           |            |               |
| SECTION       |         | VARCHAR2 | 18    |     | NULL     | REFERENCE TABLE FOR LEVEL 1<br>LOOKUP           |            |           |            |               |
| TOTAL_WIDTH   |         | NUMBER   | 4     |     | NULL     | SECTION WITHIN THE<br>FORM/SCREEN               |            |           |            | 9990          |
| ITEMID        |         | NUMBER   | 4     |     | NULL     | TOTAL DISPLAY WIDTH                             |            |           |            |               |
|               |         |          |       |     |          | Itemid number for custom<br>FLD_SEQ in Colusage |            |           |            |               |

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Report Date: 27-MAR-03  
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Table Name: EDITLIST

| Col Name    | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|-------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE  | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |                 |           |            |               |
| EI_MODEL    | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800                 |                 |           |            |               |
| EI_ID       | CNTLLOG  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER      |                 |           |            |               |
| CN          | CNTLLOG  | VARCHAR2 | 12    |     | NOT NULL | EVENT CONTROL NUMBER                               | validate_cn     |           |            |               |
| USERNAME    |          | VARCHAR2 | 30    |     | NOT NULL | ORACLE USER NAME                                   | alpha_num_check |           |            |               |
| EVNT_STAT01 |          | VARCHAR2 | 1     |     | NULL     | STATUS 01 = LAST LEVEL 2<br>EDIT THAT WAS EXECUTED | lcf_lookup      | LCFCODES  | CODE       |               |
| EVNT_STAT02 |          | VARCHAR2 | 1     |     | NULL     | STATUS 02 =<br>SUCCESSFUL/UNSUCCESSFUL L2<br>EDIT  | lcf_lookup      | LCFCODES  | CODE       |               |

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Table Name: EICONFIG

| Col Name      | FmTable | Type     | Width | Dec | Null/Not | Comment  | Validation | Ref Table | Ref Column | Column Format |
|---------------|---------|----------|-------|-----|----------|--|------------|-----------|------------|---------------|
| TEST_PHASE    | ENDITEM | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |            |           |            |               |
| EI_MODEL      | ENDITEM | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                                |            |           |            |               |
| EI_ID         | ENDITEM | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER                     |            |           |            |               |
| CN_INS        |         | VARCHAR2 | 12    |     | NOT NULL | ITEM INSTALLATION CONTROL NUMBER                               |            |           |            |               |
| TASK_NO_INS   |         | NUMBER   | 3     | 0   | NOT NULL | INSTALLATION TASK NUMBER                                       |            |           |            | 990           |
| SEQ_NO_INS    |         | NUMBER   | 4     | 1   | NOT NULL | INSTALLATION SEQUENCE NUMBER                                   |            |           |            | 90.9          |
| AGE_NEW_INS   |         | NUMBER   | 6     | 0   | NULL     | ITEM AGE SINCE NEW AT INSTALLATION                             |            |           |            | 99990         |
| AGE_NEW_REM   |         | NUMBER   | 6     | 0   | NULL     | ITEM AGE SINCE NEW AT REMOVAL                                  |            |           |            | 99990         |
| AGE_OVH_INS   |         | NUMBER   | 6     | 0   | NULL     | ITEM AGE SINCE LAST OVERHAUL AT INSTALLATION                   |            |           |            | 99990         |
| AGE_OVH_REM   |         | NUMBER   | 6     | 0   | NULL     | ITEM AGE SINCE LAST OVERHAUL AT REMOVAL                        |            |           |            | 99990         |
| CN_REM        |         | VARCHAR2 | 12    |     | NULL     | ITEM REMOVAL CONTROL NUMBER                                    |            |           |            |               |
| DISP          |         | VARCHAR2 | 2     |     | NULL     | ACTUAL DISPOSITION OF THE PART AT REMOVAL                      |            |           |            |               |
| EI_AGE_AS_OF  |         | DATE     |       |     | NULL     | LAST TIME EICONFIG WAS REGENED (ONLY INSTALLED PARTS)          |            |           |            |               |
| EI_AGE_INS    |         | NUMBER   | 6     | 1   | NULL     | AGE ON END ITEM WHEN ITEM IS INSTALLED                         |            |           |            | 9990.9        |
| EI_AGE_LATEST |         | NUMBER   | 6     | 1   | NULL     | END ITEM AGE WHEN EICONFIG LAST REGENED (ONLY INSTALLED PARTS) |            |           |            | 9990.9        |
| EI_AGE_REM    |         | NUMBER   | 6     | 1   | NULL     | AGE ON END ITEM WHEN ITEM IS REMOVED                           |            |           |            | 9990.9        |
| EI_SN         |         | VARCHAR2 | 25    |     | NULL     | END ITEM SERIAL NUMBER   |            |           |            |               |
| EI_TYP        |         | VARCHAR2 | 3     |     | NULL     | TYPE OF END ITEM I.E. AIRCRAFT, SUPPORT EQUIPMENT              |            |           |            |               |
| N2410_OVH     |         | NUMBER   | 2     | 0   | NULL     | NUMBER OF 2410 OVERHAULS                                       |            |           |            | 90            |
| PART_NO       |         | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE PART  |            |           |            |               |
| PART_SN       |         | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE PART                                      |            |           |            |               |
| PATCH         |         | VARCHAR2 | 2     |     | NULL     | SOFTWARE PATCH   |            |           |            |               |
| POS           |         | VARCHAR2 | 2     |     | NULL     | POSITION OF THE PART   |            |           |            |               |
| SEQ_NO_REM    |         | NUMBER   | 4     | 1   | NULL     | REMOVAL SEQUENCE NUMBER  |            |           |            | 90.9          |
| SFTW_VER_NO   |         | VARCHAR2 | 20    |     | NULL     | SOFTWARE VERSION NUMBER  |            |           |            |               |
| TASK_NO_REM   |         | NUMBER   | 3     | 0   | NULL     | REMOVAL TASK NUMBER  |            |           |            | 990           |
| WHEN_INS      |         | DATE     |       |     | NULL     | DATE AND TIME THE ITEM IS INSTALLED ON END ITEM                |            |           |            |               |
| WHEN_REM      |         | DATE     |       |     | NULL     | DATE AND TIME THE ITEM IS REMOVED ON END ITEM                  |            |           |            |               |
| WUC           |         | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE PART                                     |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: EIDETL

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation  | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE | ENDITEM  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |             |           |            |               |
| EI_MODEL   | ENDITEM  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800                   | lcf_lookup  | LCFCODES  | CODE       |               |
| EI_ID      | ENDITEM  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER        |             |           |            |               |
| TEST_BEG   |          | DATE     | 9     |     | NOT NULL | DATE AND TIME END ITEM IS<br>INITIATED IN TEST PHASE |             |           |            | YYDDDDHH24MI  |
| EI_BEG_AGE |          | NUMBER   | 6     | 1   | NULL     | END ITEM AGE WHEN INITIATED<br>INTO TEST PHASE       |             |           |            | 9990.9        |
| EI_END_AGE |          | NUMBER   | 6     | 1   | NULL     | END ITEM AGE WHEN LEFT TEST<br>PHASE                 |             |           |            | 9990.9        |
| EI_MODE    |          | VARCHAR2 | 1     |     | NULL     | NORMAL, FTX, PHASE<br>MAINTENANCE                    | lcf_lookup  | LCFCODES  | CODE       |               |
| LOC        |          | VARCHAR2 | 4     |     | NULL     | HOME LOCATION OF THE END<br>ITEM                     | lcf_lookup  | LCFCODES  | CODE       |               |
| PHASE_NO   |          | NUMBER   | 2     | 0   | NULL     | PHASE NUMBER FOR PHASE<br>MAINTENANCE                |             |           |            | 90            |
| TEST_END   |          | DATE     | 9     |     | NULL     | DATE AND TIME END ITEM LEFT<br>TEST PHASE            | in_the_past |           |            | YYDDDDHH24MI  |
| UTC_OWNI   |          | VARCHAR2 | 6     |     | NULL     | OWNING UIC   | unit_lookup | UNIT      | UIC        |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: ENDTITEM

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE | MODEL    | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |                 |           |            |               |
| EI_MODEL   | MODEL    | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |                 |           |            |               |
| EI_ID      |          | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER | alpha_num_check |           |            |               |
| CONTRACT   |          | VARCHAR2 | 22    |     | NULL     | CONTRACT FOR END ITEM<br>PURCHASE             |                 |           |            |               |
| EI_SN      |          | VARCHAR2 | 25    |     | NULL     | END ITEM SERIAL NUMBER                        | alpha_num_check |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: EQUIP

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE | TEST     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   | test_lookup     | TEST      | TEST_PHASE |               |
| EI_MODEL   |          | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                              | lcf_lookup      | LCFCODES  | CODE       |               |
| EQP_CAT    |          | VARCHAR2 | 1     |     | NOT NULL | EQUIPMENT CATEGORY   | lcf_lookup      | LCFCODES  | CODE       |               |
| EQP_ID     |          | VARCHAR2 | 3     |     | NOT NULL | EQUIPMENT ID   | alpha_num_check |           |            |               |
| CURR_COST  |          | NUMBER   | 11    | 2   | NULL     | COST TO ACQUIRE EQUIPMENT WITH CURRENT NSN                   |                 |           |            | 99999990.99   |
| FIA1       |          | VARCHAR2 | 1     |     | NULL     | MATERIEL CATEGORY OF THE EQUIPMENT                           | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA2       |          | VARCHAR2 | 1     |     | NULL     | APPROPRIATION AND BUDGET ACTIVITY ACCOUNT FOR THE EQUIPMENT  | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA3       |          | VARCHAR2 | 1     |     | NULL     | MANAGEMENT INVENTORY SEGMENT FOR THE EQUIPMENT               | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA45      |          | VARCHAR2 | 2     |     | NULL     | SPECIFIC GROUP/GENERIC GROUP FOR THE EQUIPMENT               | lcf_lookup      | LCFCODES  | CODE       |               |
| FSCM       |          | VARCHAR2 | 5     |     | NULL     | FEDERAL SUPPLY CODE FOR MANUFACTURERS                        | lcf_lookup      | LCFCODES  | CODE       |               |
| NOMEN      |          | VARCHAR2 | 30    |     | NULL     | NOMENCLATURE OF THE EQUIPMENT                                |                 |           |            |               |
| NSN        |          | VARCHAR2 | 13    |     | NULL     | NSN OF THE EQUIPMENT   | alpha_num_check |           |            |               |
| PART_NO    |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE EQUIPMENT                                 |                 |           |            |               |
| SMR12      |          | VARCHAR2 | 2     |     | NULL     | SOURCE CODE FOR THE EQUIPMENT                                | lcf_lookup      | LCFCODES  | CODE       |               |
| SMR3       |          | VARCHAR2 | 1     |     | NULL     | LOWEST MAINT LEVEL FOR REMOVE, REPLACE, USE OF THE EQUIPMENT | lcf_lookup      | LCFCODES  | CODE       |               |
| SMR4       |          | VARCHAR2 | 1     |     | NULL     | LOWEST MAINT LEVEL FOR COMPLETE REPAIR OF THE EQUIPMENT      | lcf_lookup      | LCFCODES  | CODE       |               |
| SMR5       |          | VARCHAR2 | 1     |     | NULL     | RECOVERABILITY CODE FOR THE EQUIPMENT                        | lcf_lookup      | LCFCODES  | CODE       |               |
| SRC_SUPPLY |          | VARCHAR2 | 3     |     | NULL     | SOURCE OF SUPPLY FOR THE EQUIPMENT                           | lcf_lookup      | LCFCODES  | CODE       |               |



## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: ERRORS

| Col Name     | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation      | Ref Table | Ref Column | Column Format |
|--------------|----------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE   | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |                 |           |            |               |
| EI_MODEL     | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |                 |           |            |               |
| EI_ID        | CNTLLOG  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |                 |           |            |               |
| CN           | CNTLLOG  | VARCHAR2 | 12    |     | NOT NULL | EVENT CONTROL NUMBER                          |                 |           |            |               |
| TABLES       |          | VARCHAR2 | 40    |     | NOT NULL | TABLE NAMES CONTAINING<br>ERRORS              |                 |           |            |               |
| TASK_NO      |          | NUMBER   | 3     | 0   | NOT NULL | TASK NUMBER OF EVENTS WITH<br>ERRORS          |                 |           |            | 990           |
| SEQ_NO       |          | NUMBER   | 5     | 1   | NOT NULL | SEQUENCE NUMBER                               |                 |           |            | 990.9         |
| EDIT_LEVEL   |          | VARCHAR2 | 2     |     | NOT NULL | EDIT LEVEL                                    |                 |           |            |               |
| L2_ERROR     |          | VARCHAR2 | 7     |     | NOT NULL | LEVEL 2 ERROR                                 |                 |           |            |               |
| ORDER_ERRORS |          | NUMBER   | 3     | 0   | NOT NULL | ORDER OF ERRORS IN PRINTOUT                   |                 |           |            | 990           |
| USERNAME     |          | VARCHAR2 | 30    |     | NOT NULL | ORACLE USER NAME                              | alpha_num_check |           |            |               |
| TEXT         |          | VARCHAR2 | 200   |     | NULL     | ERROR TEXT                                    |                 |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: EVENTS

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    | test_lookup     | TEST      | TEST_PHASE |               |
| EI_MODEL   | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |                 |           |            |               |
| EI_ID      | CNTLLOG  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |                 |           |            |               |
| CN         | CNTLLOG  | VARCHAR2 | 12    |     | NOT NULL | EVENT CONTROL NUMBER                          | validate_cn     |           |            |               |
| USERNAME   |          | VARCHAR2 | 30    |     | NOT NULL | ORACLE USER NAME                              | alpha_num_check |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: EXPDETL

| Col Name   | FrmTable | Type     | Width | Dec | Null/Not | Comment   | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| TEST_PHASE | EXPND    | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  |            |           |            |               |
| EI_MODEL   | EXPND    | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800                                |            |           |            |               |
| EXP_CAT    | EXPND    | VARCHAR2 | 1     |     | NOT NULL | EXPENDABLE CATEGORY   |            |           |            |               |
| EXP_ID     | EXPND    | VARCHAR2 | 3     |     | NOT NULL | EXPENDABLE ID   |            |           |            |               |
| SEQ_NO     |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER   |            |           |            | 90.9          |
| CURR_COST  |          | NUMBER   | 11    | 2   | NULL     | COST TO ACQUIRE EXPENDABLE<br>WITH CURRENT NSN                    |            |           |            | 99999990.99   |
| UOI        |          | VARCHAR2 | 2     |     | NULL     | SMALLEST QTY OF EXPENDABLE<br>THAT CAN BE<br>REQUISITIONED/ISSUED | lcf_lookup | LCFCODES  | CODE       |               |
| UOM        |          | VARCHAR2 | 2     |     | NULL     | UNIT OF MEASURE FOR THE<br>EXPENDABLE                             | lcf_lookup | LCFCODES  | CODE       |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: EXPND

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE | TEST     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  | test_lookup     | TEST      | TEST_PHASE |               |
| EI_MODEL   |          | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, TS00                               | lcf_lookup      | LCFCODES  | CODE       |               |
| EXP_CAT    |          | VARCHAR2 | 1     |     | NOT NULL | EXPENDABLE CATEGORY   | lcf_lookup      | LCFCODES  | CODE       |               |
| EXP_ID     |          | VARCHAR2 | 3     |     | NOT NULL | EXPENDABLE ID   | alpha_num_check |           |            |               |
| CURR_NSN   |          | VARCHAR2 | 13    |     | NULL     | CURRENT NSN FOR THE EXPENDABLE                                | alpha_num_check |           |            |               |
| FIA1       |          | VARCHAR2 | 1     |     | NULL     | MATERIEL CATEGORY OF THE EXPENDABLE                           | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA2       |          | VARCHAR2 | 1     |     | NULL     | APPROPRIATION AND BUDGET ACTIVITY ACCOUNT FOR THE EXPENDABLE  | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA3       |          | VARCHAR2 | 1     |     | NULL     | MANAGEMENT INVENTORY SEGMENT FOR THE EXPENDABLE               | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA45      |          | VARCHAR2 | 2     |     | NULL     | SPECIFIC GROUP/GENERIC GROUP FOR THE EXPENDABLE               | lcf_lookup      | LCFCODES  | CODE       |               |
| FSCM       |          | VARCHAR2 | 5     |     | NULL     | FEDERAL SUPPLY CODE FOR MANUFACTURERS                         | lcf_lookup      | LCFCODES  | CODE       |               |
| NOMEN      |          | VARCHAR2 | 30    |     | NULL     | NOMENCLATURE OF THE EXPENDABLE                                |                 |           |            |               |
| NSN        |          | VARCHAR2 | 13    |     | NULL     | NSN OF THE EXPENDABLE   | alpha_num_check |           |            |               |
| PART_NO    |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE EXPENDABLE                                 |                 |           |            |               |
| SMR12      |          | VARCHAR2 | 2     |     | NULL     | SOURCE CODE FOR THE EXPENDABLE                                | lcf_lookup      | LCFCODES  | CODE       |               |
| SMR3       |          | VARCHAR2 | 1     |     | NULL     | LOWEST MAINT LEVEL FOR REMOVE, REPLACE, USE OF THE EXPENDABLE | lcf_lookup      | LCFCODES  | CODE       |               |
| SMR4       |          | VARCHAR2 | 1     |     | NULL     | LOWEST MAINT LEVEL FOR COMPLETE REPAIR OF THE EXPENDABLE      | lcf_lookup      | LCFCODES  | CODE       |               |
| SMR5       |          | VARCHAR2 | 1     |     | NULL     | RECOVERABILITY CODE FOR THE EXPENDABLE                        | lcf_lookup      | LCFCODES  | CODE       |               |
| SRC_SUPPLY |          | VARCHAR2 | 3     |     | NULL     | SOURCE OF SUPPLY FOR THE EXPENDABLE                           | lcf_lookup      | LCFCODES  | CODE       |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: GDVALUES

| Col Name    | FmTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation | Ref Table | Ref Column | Column Format |
|-------------|---------|----------|-------|-----|----------|--|------------|-----------|------------|---------------|
| USERNAME    |         | VARCHAR2 | 30    |     | NOT NULL | ORACLE USER NAME                           |            |           |            |               |
| ANAL_BEG    |         | DATE     | 9     |     | NULL     | BEGIN DATE AND TIME OF THE ANALYSIS        |            |           |            | YYDDDDHH24MI  |
| ANAL_END    |         | DATE     | 9     |     | NULL     | END DATE AND TIME OF THE ANALYSIS          |            |           |            | YYDDDDHH24MI  |
| EI_ID       |         | VARCHAR2 | 3     |     | NULL     | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |            |           |            |               |
| EI_MODEL    |         | VARCHAR2 | 6     |     | NULL     | END ITEM MODEL I.E. AH64A, T800            |            |           |            |               |
| LAST_UPDATE |         | DATE     | 9     |     | NULL     | LAST DATE AND TIME USER RAN GETDATA REPORT |            |           |            | YYDDDDHH24MI  |
| TEST_PHASE  |         | VARCHAR2 | 6     |     | NULL     | TEST PHASE                                 |            |           |            |               |
| WHERE_A     |         | VARCHAR2 | 2000  |     | NULL     | WHERE PHRASE FOR AVAILABILITY              |            |           |            |               |
| WHERE_C     |         | VARCHAR2 | 2000  |     | NULL     | WHERE PHRASE FOR CONTROL LOG               |            |           |            |               |
| WHERE_M     |         | VARCHAR2 | 2000  |     | NULL     | WHERE PHRASE FOR MAINTENANCE               |            |           |            |               |
| WHERE_O     |         | VARCHAR2 | 2000  |     | NULL     | WHERE PHRASE FOR OPERATIONS                |            |           |            |               |
| WHERE_R     |         | VARCHAR2 | 2000  |     | NULL     | WHERE PHRASE FOR READINGS                  |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: IMAGES

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                   | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---------------------------|------------|-----------|------------|---------------|
| TEST_PHASE | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                |            | TEST      | TEST_PHASE |               |
| EI_MODEL   | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL            |            | MODEL     | EI_MODEL   |               |
| EI_ID      | CNTLLOG  | VARCHAR2 | 3     |     | NOT NULL | END ITEM ID               |            | ENDITEM   | EI_ID      |               |
| CN         | CNTLLOG  | VARCHAR2 | 12    |     | NOT NULL | CONTROL NUMBER            |            | CNTLLOG   | CN         |               |
| SEQ_NO     |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER PER EVENT |            |           |            | 99.9          |
| TEXT       |          | VARCHAR2 | 100   |     | NULL     | TEXT DESCRIPTION OF IMAGE |            |           |            |               |
| FILENAME   |          | VARCHAR2 | 20    |     | NULL     | FILENAME OF IMAGE         |            |           |            |               |
| IMAGE      |          | BLOB     |       |     | NULL     | IMAGE BINARY DATA         |            |           |            |               |

## UNIRAM Data Dictionary

Report Date: 27-MAR-03  
03086

Table Name: LCFCODES

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment      | Validation       | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--------------|------------------|-----------|------------|---------------|
| TEST_PHASE | TEST     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   | test_lookup      | TEST      | TEST_PHASE |               |
| CODE_TYP   |          | VARCHAR2 | 15    |     | NOT NULL | CODE TYPE    | uniram_dd_lookup |           |            |               |
| CODE       |          | VARCHAR2 | 15    |     | NOT NULL | CODE VALUE   | alpha_num_check  |           |            |               |
| CODE_SRC   |          | VARCHAR2 | 1     |     | NULL     | CODE SOURCE  | sys_lookup       | SYSCODES  | CODE       |               |
| MEANING    |          | VARCHAR2 | 60    |     | NULL     | CODE MEANING |                  |           |            |               |
| TEXT       |          | VARCHAR2 | 2000  |     | NULL     | CODE TEXT    |                  |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: MNTACTN

| Col Name       | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation  | Ref Table | Ref Column | Column Format |
|----------------|----------|----------|-------|-----|----------|---|-------------|-----------|------------|---------------|
| TEST_PHASE     | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |             |           |            |               |
| EI_MODEL       | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800               |             |           |            |               |
| EI_ID          | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER    |             |           |            |               |
| CN_MNT         | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL NUMBER              |             |           |            |               |
| TASK_NO        |          | NUMBER   | 3     | 0   | NOT NULL | MAINTENANCE TASK NUMBER                       |             |           |            | 990           |
| SEQ_NO         |          | NUMBER   | 5     | 1   | NOT NULL | SEQUENCE NUMBER                               |             |           |            | 990.9         |
| ACTN_BEG       |          | DATE     | 9     |     | NULL     | BEGIN DATE AND TIME OF THE MAINTENANCE ACTION | in_the_past |           |            | YYDDDDHH24MI  |
| ACTN_END       |          | DATE     | 9     |     | NULL     | END DATE AND TIME OF THE MAINTENANCE ACTION   | in_the_past |           |            | YYDDDDHH24MI  |
| ACTN_MH        |          | NUMBER   | 5     | 1   | NULL     | ACTION MANHOOURS                              |             |           |            | 990.9         |
| ACTN_MOS       |          | VARCHAR2 | 5     |     | NULL     | MOS FOR THIS ACTION                           | lcf_lookup  | LCFCODES  | CODE       |               |
| ACTN_RED       |          | VARCHAR2 | 1     |     | NULL     | REDINESS DUE TO THIS ACTION                   | lcf_lookup  | LCFCODES  | CODE       |               |
| ACTN_STAT      |          | VARCHAR2 | 1     |     | NULL     | STATUS DUE TO THIS ACTION                     | lcf_lookup  | LCFCODES  | CODE       |               |
| DELAY_TYP_MNT  |          | VARCHAR2 | 1     |     | NULL     | REASON FOR MAINTENANCE DELAY                  | lcf_lookup  | LCFCODES  | CODE       |               |
| DIR_IND        |          | VARCHAR2 | 1     |     | NULL     | DIRECT OR INDIRECT MAINTENANCE                | check const |           |            |               |
| EVAL_GEAR      |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF GEAR                            | lcf_lookup  | LCFCODES  | CODE       |               |
| EVAL_LEVEL     |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF MAINTENANCE LEVEL               | lcf_lookup  | LCFCODES  | CODE       |               |
| EVAL_MANL      |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF MANUALS                         | lcf_lookup  | LCFCODES  | CODE       |               |
| EVAL_MOS       |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF MOS                             | lcf_lookup  | LCFCODES  | CODE       |               |
| EVAL_TRNG      |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF TRAINING                        | lcf_lookup  | LCFCODES  | CODE       |               |
| EVNT_CLASS     |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                  | check const |           |            |               |
| GEAR_USED      |          | VARCHAR2 | 1     |     | NULL     | PERSONNEL GEAR USED                           | lcf_lookup  | LCFCODES  | CODE       |               |
| MNT_ACTN_CODE  |          | VARCHAR2 | 2     |     | NULL     | MAINTENANCE ACTION PERFORMED                  | lcf_lookup  | LCFCODES  | CODE       |               |
| MNT_ACTN_LEVEL |          | VARCHAR2 | 1     |     | NULL     | MAINTENANCE LEVEL FOR THIS ACTION             | lcf_lookup  | LCFCODES  | CODE       |               |
| PID            |          | VARCHAR2 | 6     |     | NULL     | PERSONNEL IDENTIFIER CODE                     | unit_lookup | PEOPLE    | PID        |               |
| TEXT           |          | VARCHAR2 | 2000  |     | NULL     | NARRATIVE TEXT                                |             |           |            |               |



## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: MNTEQUIP

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |                 |           |            |               |
| EI_MODEL   | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |                 |           |            |               |
| EI_ID      | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |                 |           |            |               |
| CN_MNT     | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL<br>NUMBER           |                 |           |            |               |
| TASK_NO    |          | NUMBER   | 3     | 0   | NOT NULL | MAINTENANCE TASK NUMBER                       |                 |           |            | 990           |
| SEQ_NO     |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                               |                 |           |            | 90.9          |
| EQP_CAT    |          | VARCHAR2 | 1     |     | NULL     | EQUIPMENT CATEGORY                            | lcf_lookup      | LCFCODES  | CODE       |               |
| EQP_ID     |          | VARCHAR2 | 3     |     | NULL     | EQUIPMENT ID                                  | equip_lookup    | EQUIP     | EQP_ID     |               |
| EQP_SN     |          | VARCHAR2 | 10    |     | NULL     | SERIAL NUMBER OF THE<br>EQUIPMENT             | alpha_num_check |           |            |               |
| EVAL_EQP   |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF EQUIPMENT                       | lcf_lookup      | LCFCODES  | CODE       |               |
| EVNT_CLASS |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                  | check const     |           |            |               |

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Table Name: MNTEVENT

| Col Name      | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation      | Ref Table | Ref Column | Column Format |
|---------------|----------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE    | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  | test_lookup     | TEST      | TEST_PHASE |               |
| EI_MODEL      | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                             |                 |           |            |               |
| EI_ID         | CNTLLOG  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER                  |                 |           |            |               |
| CN_MNT        | CNTLLOG  | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL NUMBER                            | validate_cn     |           |            |               |
| ALDT          |          | NUMBER   | 7     | 1   | NULL     | ADMINISTRATIVE AND LOGISTICS                                |                 |           |            | 99990.9       |
| CN_REF        |          | VARCHAR2 | 12    |     | NULL     | RELATED EVENT CONTROL NUMBER                                | validate_cn     |           |            |               |
| DELAY_TYP_MNT |          | VARCHAR2 | 1     |     | NULL     | REASON FOR INITIAL MAINTENANCE DELAY                        | lcf_lookup      | LCFCODES  | CODE       |               |
| DIRECTIVE     |          | VARCHAR2 | 20    |     | NULL     | DIRECTIVE NUMBER  |                 |           |            |               |
| EI_BEG_AGE    |          | NUMBER   | 6     | 1   | NULL     | END ITEM AGE WHEN THE EVENT BEGINS                          |                 |           |            | 9990.9        |
| EI_END_AGE    |          | NUMBER   | 6     | 1   | NULL     | END ITEM AGE WHEN THE EVENT ENDS                            |                 |           |            | 9990.9        |
| EI_OP         |          | VARCHAR2 | 1     |     | NULL     | END ITEM OPERABILITY  | lcf_lookup      | LCFCODES  | CODE       |               |
| EI_SN         |          | VARCHAR2 | 25    |     | NULL     | END ITEM SERIAL NUMBER                                      | model_lookup    | ENDITEM   | EI_SN      |               |
| EI_TYP        |          | VARCHAR2 | 3     |     | NULL     | TYPE OF END ITEM I.E. AIRCRAFT, SUPPORT EQUIPMENT           | model_lookup    | MODEL     | EI_TYP     |               |
| EVNT_BEG      |          | DATE     | 9     |     | NULL     | BEGIN DATE AND TIME OF PERFORMANCE OF THE MAINTENANCE EVENT | in_the_past     |           |            | YYDDDDHH24MI  |
| EVNT_CLASS    |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                                | check const     |           |            |               |
| EVNT_END      |          | DATE     | 9     |     | NULL     | END DATE AND TIME OF PERFORMANCE OF THE MAINTENANCE EVENT   | in_the_past     |           |            | YYDDDDHH24MI  |
| FAIL_CODE     |          | VARCHAR2 | 3     |     | NULL     | EVENT FAILURE CODE  | lcf_lookup      | LCFCODES  | CODE       |               |
| HOW_REC       |          | VARCHAR2 | 1     |     | NULL     | HOW FAULT WAS RECOGNIZED                                    | lcf_lookup      | LCFCODES  | CODE       |               |
| HRS_ACM       |          | NUMBER   | 7     | 1   | NULL     | EVENT ACTIVE CLOCK MAINTENANCE HOURS DIRECT & INDIRECT      |                 |           |            | 99990.9       |
| LEVEL_MNT     |          | VARCHAR2 | 1     |     | NULL     | ACTUAL LEVEL OF MAINTENANCE PERFORMED FOR THIS EVENT        | lcf_lookup      | LCFCODES  | CODE       |               |
| LEVEL_PRSC    |          | VARCHAR2 | 1     |     | NULL     | PRESCRIBED LEVEL OF MAINTENANCE IN MAC                      | lcf_lookup      | LCFCODES  | CODE       |               |
| LEVEL_REC     |          | VARCHAR2 | 1     |     | NULL     | RECOMMENDED LEVEL OF MAINTENANCE PER MAINT PERSON           | lcf_lookup      | LCFCODES  | CODE       |               |
| LOC           |          | VARCHAR2 | 4     |     | NULL     | LOCATION OF EVENT ORIGINATION                               | lcf_lookup      | LCFCODES  | CODE       |               |
| MAL_EFF_MSN   |          | VARCHAR2 | 1     |     | NULL     | EFFECT OF MALFUNCTION ON THE MISSION                        | lcf_lookup      | LCFCODES  | CODE       |               |
| MAL_EFF_OPN   |          | VARCHAR2 | 1     |     | NULL     | EFFECT OF MALFUNCTION ON THE OPERATION                      | lcf_lookup      | LCFCODES  | CODE       |               |
| MAL_EFF_SYS   |          | VARCHAR2 | 1     |     | NULL     | EFFECT OF MALFUNCTION ON THE SYSTEM                         | lcf_lookup      | LCFCODES  | CODE       |               |
| MDC_PART_NO   |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE MAJOR DYNAMIC COMPONENT                  | workunit_lookup | PART      | PART_NO    |               |

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Table Name: MNTSEVENT

| Col Name     | FmTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|--------------|---------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| MDC_PART_SN  |         | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE MAJOR DYNAMIC COMPONENT                           | alpha_num_check |           |            |               |
| MDC_POS      |         | VARCHAR2 | 2     |     | NULL     | POSITION OF THE MAJOR DYNAMIC COMPONENT                                | workunit_lookup | POSITION  | POS        |               |
| MDC_WUC      |         | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE MAJOR DYNAMIC COMPONENT                          | workunit_lookup | WORKUNIT  | WUC        |               |
| MFSCORE1     |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 1  | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE10    |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 10   | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE11    |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 11   | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE2     |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 2  | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE3     |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 3  | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE4     |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 4  | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE5     |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 5  | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE6     |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 6  | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE7     |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 7  | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE8     |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 8  | lcf_lookup      | LCFCODES  | CODE       |               |
| MFSCORE9     |         | VARCHAR2 | 1     |     | NULL     | MAINT FINAL SCORE BLOCK 9  | lcf_lookup      | LCFCODES  | CODE       |               |
| MNT_FUNC     |         | VARCHAR2 | 2     |     | NULL     | MAINTENANCE EVENT FUNCTION PERFORMED                                   | lcf_lookup      | LCFCODES  | CODE       |               |
| MNT_INTRVL   |         | VARCHAR2 | 1     |     | NULL     | TYPE OF MAINTENANCE INTERVAL   | lcf_lookup      | LCFCODES  | CODE       |               |
| MNT_MH_DRCT  |         | NUMBER   | 5     | 1   | NULL     | I.E. 10 DAYS, 6 MONTHS   |                 |           |            | 990.9         |
| MNT_MH_IDRCT |         | NUMBER   | 5     | 1   | NULL     | EVENT MAINTENANCE MANHOURS DIRECT                                      |                 |           |            | 990.9         |
| MPSCORE1     |         | VARCHAR2 | 1     |     | NULL     | EVENT MAINTENANCE MANHOURS INDIRECT                                    |                 |           |            |               |
| MPSCORE10    |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 1   | lcf_lookup      | LCFCODES  | CODE       |               |
| MPSCORE11    |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 10  | lcf_lookup      | LCFCODES  | CODE       |               |
| MPSCORE2     |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 11  | lcf_lookup      | LCFCODES  | CODE       |               |
| MPSCORE3     |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 2   | lcf_lookup      | LCFCODES  | CODE       |               |
| MPSCORE4     |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 3   | lcf_lookup      | LCFCODES  | CODE       |               |
| MPSCORE5     |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 4   | lcf_lookup      | LCFCODES  | CODE       |               |
| MPSCORE6     |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 5   | lcf_lookup      | LCFCODES  | CODE       |               |
| MPSCORE7     |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 6   | lcf_lookup      | LCFCODES  | CODE       |               |
| MPSCORE8     |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 7   | lcf_lookup      | LCFCODES  | CODE       |               |
| MPSCORE9     |         | VARCHAR2 | 1     |     | NULL     | MAINT PRELIM SCORE BLOCK 8   | lcf_lookup      | LCFCODES  | CODE       |               |
| PART_NO      |         | VARCHAR2 | 20    |     | NULL     | MAINT PRELIM SCORE BLOCK 9   | lcf_lookup      | LCFCODES  | CODE       |               |
|              |         |          |       |     |          | PART NUMBER OF THE MAINTENANCE SUBJECT COMPONENT                       | workunit_lookup | PART      | PART_NO    |               |
| PART_SN      |         | VARCHAR2 | 20    |     | NULL     | MAINTENANCE SUBJECT SERIAL NUMBER OF THE MAINTENANCE SUBJECT COMPONENT | alpha_num_check |           |            |               |

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Table Name: MNTVEVENT

| Col Name        | FmtTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|-----------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| POS             |          | VARCHAR2 | 2     |     | NULL     | POSITION OF THE MAINTENANCE SUBJECT COMPONENT                              | workunit_lookup | POSITION  | POS        |               |
| SC_NO           |          | NUMBER   | 1     | 0   | NULL     | SCORING CONFERENCE NUMBER THAT ASSIGNED FINAL SCORES                       |                 |           |            | 0             |
| SC_RESULT       |          | VARCHAR2 | 1     |     | NULL     | SCORING CONFERENCE RESULT  | lcf_lookup      | LCFCODES  | CODE       |               |
| STAT_ARM_MNT    |          | VARCHAR2 | 1     |     | NULL     | ARMAMENT SYSTEM STATUS AT EVENT START                                      | lcf_lookup      | LCFCODES  | CODE       |               |
| STAT_EI_MNT     |          | VARCHAR2 | 1     |     | NULL     | END ITEM STATUS AT EVENT START   | lcf_lookup      | LCFCODES  | CODE       |               |
| STAT_ELEC_MNT   |          | VARCHAR2 | 1     |     | NULL     | ELECTRICAL SYSTEM STATUS AT EVENT START                                    | lcf_lookup      | LCFCODES  | CODE       |               |
| STAT_OTHER_MNT  |          | VARCHAR2 | 1     |     | NULL     | OTHER SYSTEMS STATUS AT EVENT START  | lcf_lookup      | LCFCODES  | CODE       |               |
| UIC_MNT         |          | VARCHAR2 | 6     |     | NULL     | PREDOMINANT MAINTENANCE UNIT IDENTIFIER CODE                               | unit_lookup     | UNIT      | UIC        |               |
| UIC_OWN         |          | VARCHAR2 | 6     |     | NULL     | OWNING UIC   | model_lookup    | EIDETL    | UIC_OWN    |               |
| WHEN_DISC       |          | VARCHAR2 | 2     |     | NULL     | WHEN THE FAULT WAS DISCOVERED  | lcf_lookup      | LCFCODES  | CODE       |               |
| WHEN_OCC        |          | VARCHAR2 | 2     |     | NULL     | WHEN THE FAULT OCCURRED  | lcf_lookup      | LCFCODES  | CODE       |               |
| WUC             |          | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE MAINTENANCE SUBJECT COMPONENT                        | workunit_lookup | WORKUNIT  | WUC        |               |
| HRS_ACM_DIR     |          | NUMBER   | 7     | 1   | NULL     | EVENT ACTIVE CLOCK   |                 |           |            | 99990.9       |
| SPEC_NO         |          | NUMBER   | 6     | 0   | NULL     | MAINTENANCE HOURS DIRECT   |                 |           |            | 999990        |
| SPEC_SC1        |          | VARCHAR2 | 2     | 2   | NULL     | SPECIAL NUMBER   |                 |           |            | 0.99          |
| SPEC_SC2        |          | VARCHAR2 | 2     | 2   | NULL     | SPECIAL SCORE 1  |                 |           |            | 0.99          |
| MNT_MH_DRCT_ECT |          | NUMBER   | 6     | 1   | NULL     | SPECIAL SCORE 2  |                 |           |            | 9990.9        |
| HRS_ACM_ECT     |          | NUMBER   | 6     | 1   | NULL     | EVENT MAINTENANCE MANHOURS DIRECT EXCLUDING CURE TIME                      |                 |           |            | 9990.9        |
| HRS_ACM_DIR_ECT |          | NUMBER   | 6     | 1   | NULL     | EVENT ACTIVE CLOCK MAINTENANCE HOURS DIRECT & INDIRECT EXCLUDING CURE TIME |                 |           |            | 9990.9        |

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Table Name: MNTEXPND

| Col Name    | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation   | Ref Table | Ref Column | Column Format |
|-------------|----------|----------|-------|-----|----------|---|--------------|-----------|------------|---------------|
| TEST_PHASE  | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |              |           |            |               |
| EI_MODEL    | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |              |           |            |               |
| EI_ID       | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |              |           |            |               |
| CN_MNT      | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL<br>NUMBER           |              |           |            |               |
| TASK_NO     |          | NUMBER   | 3     | 0   | NOT NULL | MAINTENANCE TASK NUMBER                       |              |           |            | 990           |
| SEQ_NO      |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                               |              |           |            | 90.9          |
| CONSUME_TYP |          | VARCHAR2 | 1     |     | NULL     | EXPENDABLE VS. SERVICE TYPE                   | lcf_lookup   | LCFCODES  | CODE       |               |
| EVNT_CLASS  |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                  | check const  |           |            |               |
| EXP_CAT     |          | VARCHAR2 | 1     |     | NULL     | EXPENDABLE CATEGORY                           | lcf_lookup   | LCFCODES  | CODE       |               |
| EXP_ID      |          | VARCHAR2 | 3     |     | NULL     | EXPENDABLE ID                                 | expnd_lookup | EXPND     | EXP_ID     |               |
| LOT_DATE    |          | DATE     | 4     |     | NULL     | MONTH AND YEAR LOT WAS<br>MANUFACTURED        | in_the_past  |           |            | MMYY          |
| LOT_NO      |          | VARCHAR2 | 30    |     | NULL     | LOT NUMBER                                    |              |           |            |               |
| METHOD      |          | VARCHAR2 | 1     |     | NULL     | METHOD USED TO ACCOMPLISH<br>PURPOSE          | lcf_lookup   | LCFCODES  | CODE       |               |
| PURPOSE     |          | VARCHAR2 | 1     |     | NULL     | PURPOSE FOR<br>EXPENDABLE/SERVICE ACTION      | lcf_lookup   | LCFCODES  | CODE       |               |
| QTY         |          | NUMBER   | 4     | 0   | NULL     | QUANTITY OF EXPENDABLE                        |              |           |            | 9990          |
| UOM         |          | VARCHAR2 | 2     |     | NULL     | UNIT OF MEASURE FOR THE<br>EXPENDABLE         | lcf_lookup   | LCFCODES  | CODE       |               |

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Table Name: MNTRMONT

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |                 |           |            |               |
| EI_MODEL   | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |                 |           |            |               |
| EI_ID      | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |                 |           |            |               |
| CN_MNT     | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL NUMBER           |                 |           |            |               |
| BITE_A     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK A = USAGE                       | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_B     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK B = MONITORED                   | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_C     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK C = DETECTABLE                  | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_D     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK D = DETECTION                   | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_E     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK E = ISOLATION                   | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_F     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK F = CONFIRMED                   | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_G     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK G = FAULT<br>CONFIRMED          | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_H     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK H                               | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_I     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK I                               | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_J     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK J                               | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_K     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK K                               | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_L     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK L = TECH MANUAL                 | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_M     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK M = CONTRACTOR ASSIST           | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_N     |          | VARCHAR2 | 1     |     | NULL     | BITE BLOCK N = TMDE                        | lcf_lookup      | LCFCODES  | CODE       |               |
| BITE_WUC   |          | VARCHAR2 | 15    |     | NULL     | BITE WORK UNIT CODE                        | workunit_lookup | WORKUNIT  | WUC        |               |
| FDIS_A     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK A = USAGE                       | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_B     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK B = MONITORED                   | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_C     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK C = DETECTABLE                  | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_D     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK D = DETECTION                   | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_E     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK E = ISOLATION                   | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_F     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK F = CONFIRMED                   | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_G     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK G = FAULT<br>CONFIRMED          | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_H     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK H                               | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_I     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK I                               | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_J     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK J                               | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_K     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK K                               | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_L     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK L = TECH MANUAL                 | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_M     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK M = CONTRACTOR ASSIST           | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_N     |          | VARCHAR2 | 1     |     | NULL     | FDIS BLOCK N = TMDE                        | lcf_lookup      | LCFCODES  | CODE       |               |
| FDIS_WUC   |          | VARCHAR2 | 15    |     | NULL     | FDIS WORK UNIT CODE                        | workunit_lookup | WORKUNIT  | WUC        |               |

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Table Name: MNTMONTR

| Col Name | FrnTable | Type     | Width | Dec | Null/Not | Comment        | Validation | Ref Table | Ref Column | Column Format |
|----------|----------|----------|-------|-----|----------|----------------|------------|-----------|------------|---------------|
| TEXT     |          | VARCHAR2 | 2000  |     | NULL     | NARRATIVE TEXT |            |           |            |               |

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Report Date: 27-MAR-03  
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Table Name: MNTPART

| Col Name    | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation      | Ref Table | Ref Column    | Column Format |
|-------------|----------|----------|-------|-----|----------|--|-----------------|-----------|---------------|---------------|
| TEST_PHASE  | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |                 |           |               |               |
| EI_MODEL    | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |                 |           |               |               |
| EI_ID       | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |                 |           |               |               |
| CN_MNT      | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL NUMBER           |                 |           |               |               |
| TASK_NO     |          | NUMBER   | 3     | 0   | NOT NULL | MAINTENANCE TASK NUMBER                    |                 |           |               | 990           |
| SEQ_NO      |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |                 |           |               | 90.9          |
| AGE_INS     |          | NUMBER   | 6     | 0   | NULL     | AGE SINCE INSTALLED                        |                 |           |               | 999990        |
| AGE_NEW     |          | NUMBER   | 6     | 0   | NULL     | AGE SINCE NEW                              |                 |           |               | 999990        |
| AGE_OVH     |          | NUMBER   | 6     | 0   | NULL     | AGE SINCE OVERHAUL                         |                 |           |               | 999990        |
| DISP        |          | VARCHAR2 | 1     |     | NULL     | ACTUAL DISPOSITION OF THE PART             | lcf_lookup      |           | LCFCODES CODE |               |
| EVNT_CLASS  |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS               | check const     |           |               |               |
| FAIL_CODE   |          | VARCHAR2 | 3     |     | NULL     | PART FAILURE CODE                          | lcf_lookup      |           | LCFCODES CODE |               |
| N2410_OVH   |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF 2410 OVERHAULS                   |                 |           |               | 90            |
| PART_NO     |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE PART                    | workunit_lookup | PART      | PART_NO       |               |
| PART_SN     |          | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE PART                  | alpha_num_check |           |               |               |
| PART_SOURCE |          | VARCHAR2 | 1     |     | NULL     | PART SOURCE FOR INSTALLED PART             | lcf_lookup      |           | LCFCODES CODE |               |
| PATCH       |          | VARCHAR2 | 2     |     | NULL     | SOFTWARE PATCH                             | workunit_lookup | PATCH     | PATCH         |               |
| POS         |          | VARCHAR2 | 2     |     | NULL     | POSITION OF THE PART                       | workunit_lookup | POSITION  | POS           |               |
| QTY         |          | NUMBER   | 4     | 0   | NULL     | QUANTITY OF PARTS                          |                 |           |               | 9990          |
| SFTW_VER_NO |          | VARCHAR2 | 20    |     | NULL     | SOFTWARE VERSION NUMBER                    | workunit_lookup | SOFTWARE  | SFTW_VER_NO   |               |
| WUC         |          | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE PART                 | workunit_lookup | WORKUNIT  | WUC           |               |
| PART_EI_HRS |          | NUMBER   | 6     | 1   | NULL     |  |                 |           |               | 99999.9       |



## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: MNTREAD

| Col Name       | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation      | Ref Table | Ref Column | Column Format |
|----------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE     | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |                 |           |            |               |
| EI_MODEL       | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |                 |           |            |               |
| EI_ID          | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |                 |           |            |               |
| CN_MNT         | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | RELATED EVENT CONTROL NUMBER               |                 |           |            |               |
| TASK_NO        |          | NUMBER   | 3     | 0   | NOT NULL | MAINTENANCE TASK NUMBER                    |                 |           |            | 990           |
| SEQ_NO         |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |                 |           |            | 90.9          |
| COMP_HRS       |          | NUMBER   | 8     | 1   | NULL     | COMPONENT HOURS AT TIME OF METER READING   |                 |           |            | 999990.9      |
| DATA_SOURCE    |          | VARCHAR2 | 2     |     | NULL     | DATA SOURCE FOR THE METER READING          | lcf_lookup      | LCFCODES  | CODE       |               |
| EVNT_CLASS     |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS               | check const     |           |            |               |
| PART_NO        |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE PART/METER              | workunit_lookup | PART      | PART_NO    |               |
| PART_SN        |          | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE PART/METER            | alpha_num_check |           |            |               |
| POS            |          | VARCHAR2 | 2     |     | NULL     | POSITION OF THE PART/METER                 | workunit_lookup | POSITION  | POS        |               |
| READOUT        |          | NUMBER   | 9     | 1   | NULL     | READOUT/INDICATION                         |                 |           |            | 9999990.9     |
| READ_UOM       |          | VARCHAR2 | 2     |     | NULL     | READING UNIT OF MEASURE                    | lcf_lookup      | LCFCODES  | CODE       |               |
| TYPE_INDIC_MNT |          | VARCHAR2 | 1     |     | NULL     | TYPE OF INDICATION                         | lcf_lookup      | LCFCODES  | CODE       |               |
| WUC            |          | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE PART/METER           | workunit_lookup | WORKUNIT  | WUC        |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: MNTRUN

| Col Name   | FnTable  | Type     | Width | Dec | Null/Not | Comment                                    | Validation  | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |             |           |            |               |
| EI_MODEL   | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |             |           |            |               |
| EI_ID      | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |             |           |            |               |
| CN_MNT     | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL NUMBER           |             |           |            |               |
| TASK_NO    |          | NUMBER   | 3     | 0   | NOT NULL | MAINTENANCE TASK NUMBER                    |             |           |            | 990           |
| SEQ_NO     |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |             |           |            | 90.9          |
| APU_PURP1  |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR AIR POWER                     | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP2  |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR ELECTRICAL POWER              | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP3  |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR HYDRAULIC POWER               | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP4  |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR ENVIRONMENTAL POWER           | lcf_lookup  | LCFCODES  | CODE       |               |
| ENG_NUM    |          | NUMBER   | 1     | 0   | NULL     | ENGINE NUMBER                              |             |           |            | 0             |
| EVNT_CLASS |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS               | check const |           |            |               |
| RUN_BEG    |          | DATE     | 9     |     | NULL     | BEGIN DATE AND TIME FOR MAINTENANCE RUN    | in_the_past |           |            | YYDDDDHH24MI  |
| RUN_END    |          | DATE     | 9     |     | NULL     | END DATE AND TIME FOR MAINTENANCE RUN      | in_the_past |           |            | YYDDDDHH24MI  |
| RUN_TYP    |          | VARCHAR2 | 2     |     | NULL     | TYPE OF MAINTENANCE RUN                    |             |           |            |               |
| RUN_USG    |          | NUMBER   | 4     | 1   | NULL     | TOTAL RUN USAGE                            | lcf_lookup  | LCFCODES  | CODE       | 90.9          |

Table Name: MNTRUNSM

| Col Name       | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation  | Ref Table | Ref Column | Column Format |
|----------------|----------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE     | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |             |           |            |               |
| EI_MODEL       | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                    |             |           |            |               |
| EI_ID          | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER         |             |           |            |               |
| CN_MNT         | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL NUMBER                   |             |           |            |               |
| APU_AIR_START  |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES THE APU WAS STARTED IN THE AIR     |             |           |            | 90            |
| APU_GND_START  |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES THE APU WAS STARTED ON THE GROUND  |             |           |            | 90            |
| APU_PURP1      |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR AIR POWER                             | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP2      |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR ELECTRICAL POWER                      | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP3      |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR HYDRAULIC POWER                       | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP4      |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR ENVIRONMENTAL POWER                   | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_USG        |          | NUMBER   | 4     | 1   | NULL     | TOTAL APU USAGE                                    |             |           |            | 90.9          |
| ENG1_AIR_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 1 WAS STARTED IN THE AIR    |             |           |            | 90            |
| ENG1_GND_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 1 WAS STARTED ON THE GROUND |             |           |            | 90            |
| ENG1_USG       |          | NUMBER   | 4     | 1   | NULL     | TOTAL ENGINE 1 USAGE                               |             |           |            | 90.9          |
| ENG2_AIR_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 2 WAS STARTED IN THE AIR    |             |           |            | 90            |
| ENG2_GND_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 2 WAS STARTED ON THE GROUND |             |           |            | 90            |
| ENG2_USG       |          | NUMBER   | 4     | 1   | NULL     | TOTAL ENGINE 2 USAGE                               |             |           |            | 90.9          |
| ENG3_AIR_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 3 WAS STARTED IN THE AIR    |             |           |            | 90            |
| ENG3_GND_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 3 WAS STARTED ON THE GROUND |             |           |            | 90            |
| ENG3_USG       |          | NUMBER   | 4     | 1   | NULL     | TOTAL ENGINE 3 USAGE                               |             |           |            | 90.9          |
| ENG4_AIR_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 4 WAS STARTED IN THE AIR    |             |           |            | 90            |
| ENG4_GND_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 4 WAS STARTED ON THE GROUND |             |           |            | 90            |
| ENG4_USG       |          | NUMBER   | 4     | 1   | NULL     | TOTAL ENGINE 4 USAGE                               |             |           |            | 90.9          |
| EVNT_CLASS     |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                       | check const |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: MNTTASK

| Col Name        | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation      | Ref Table | Ref Column    | Column Format |
|-----------------|----------|----------|-------|-----|----------|---|-----------------|-----------|---------------|---------------|
| TEST_PHASE      | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  |                 |           |               |               |
| EI_MODEL        | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800   |                 |           |               |               |
| EI_ID           | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER                                |                 |           |               |               |
| CN_MNT          | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL NUMBER  |                 |           |               |               |
| TASK_NO         |          | NUMBER   | 3     | 0   | NOT NULL | MAINTENANCE TASK NUMBER   |                 |           |               | 990           |
| HRS_ACM         |          | NUMBER   | 7     | 1   | NULL     | TASK ACTIVE CLOCK MAINTENANCE HOURS DIRECT & INDIRECT                     |                 |           |               | 99990.9       |
| MNT_MH_DRCT     |          | NUMBER   | 5     | 1   | NULL     | TASK MAINTENANCE MANHOURS DIRECT  |                 |           |               | 990.9         |
| MNT_MH_IDRCT    |          | NUMBER   | 5     | 1   | NULL     | TASK MAINTENANCE MANHOURS INDIRECT  |                 |           |               | 990.9         |
| MNT_TASK_FUNC   |          | VARCHAR2 | 2     |     | NULL     | MAINTENANCE TASK FUNCTION   | lcf_lookup      |           | LCFCODES CODE |               |
| OFF_EI          |          | VARCHAR2 | 1     |     | NULL     | WAS REPAIR DONE ON OR OFF THE END ITEM?                                   | check const     |           |               |               |
| PART_NO         |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE PART   | workunit_lookup | PART      | PART_NO       |               |
| PART_SN         |          | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE PART   | alpha_num_check |           |               |               |
| POS             |          | VARCHAR2 | 2     |     | NULL     | POSITION OF THE PART  | workunit_lookup | POSITION  | POS           |               |
| TASK_BEG        |          | DATE     | 9     |     | NULL     | BEGIN DATE AND TIME OF THE MAINTENANCE TASK                               | in_the_past     |           |               | YYDDDDHH24MI  |
| TASK_END        |          | DATE     | 9     |     | NULL     | END DATE AND TIME OF THE MAINTENANCE TASK                                 | in_the_past     |           |               | YYDDDDHH24MI  |
| UIC_MNT         |          | VARCHAR2 | 6     |     | NULL     | PREDOMINANT MAINTENANCE UNIT IDENTIFIER CODE                              | unit_lookup     | UNIT      | UIC           |               |
| WUC             |          | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE PART  | workunit_lookup | WORKUNIT  | WUC           |               |
| HRS_ACM_DIR     |          | NUMBER   | 7     | 1   | NULL     | TASK ACTIVE CLOCK MAINTENANCE HOURS DIRECT                                |                 |           |               | 99990.9       |
| MNT_MH_DRCT_ECT |          | NUMBER   | 5     | 1   | NULL     | TASK MAINTENANCE MANHOURS DIRECT EXCLUDING CURE TIME                      |                 |           |               | 990.9         |
| HRS_ACM_ECT     |          | NUMBER   | 6     | 1   | NULL     | TASK ACTIVE CLOCK MAINTENANCE HOURS DIRECT & INDIRECT EXCLUDING CURE TIME |                 |           |               | 9990.9        |
| HRS_ACM_DIR_ECT |          | NUMBER   | 6     | 1   | NULL     | TASK ACTIVE CLOCK MAINTENANCE HOURS DIRECT EXCLUDING CURE TIME            |                 |           |               | 9990.9        |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: MNTTEXT

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| TEST_PHASE | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |            |           |            |               |
| EI_MODEL   | MNTEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |            |           |            |               |
| EI_ID      | MNTEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |            |           |            |               |
| CN_MNT     | MNTEVENT | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL<br>NUMBER           |            |           |            |               |
| TEXT_TYP   |          | VARCHAR2 | 1     |     | NOT NULL | TYPE OF TEXT                                  | lcf_lookup | LCFCODES  | CODE       |               |
| TEXT       |          | VARCHAR2 | 4000  |     | NULL     | NARRATIVE TEXT                                |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: MODEL

| Col Name     | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|--------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE   | TEST     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   | test_lookup     | TEST      | TEST_PHASE |               |
| EI_MODEL     |          | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800                   | lcf_lookup      | LCFCODES  | CODE       |               |
| BASIC_WT     |          | NUMBER   | 6     | 0   | NULL     | WEIGHT OF END ITEM W/ NORMAL<br>CREW                 |                 |           |            | 999990        |
| DIFF_EI_ID   |          | VARCHAR2 | 1     |     | NULL     | ALLOW DIFFERENCE EI_ID FOR<br>CN_REF                 | check const     |           |            |               |
| EI_TYP       |          | VARCHAR2 | 3     |     | NULL     | TYPE OF END ITEM I.E.<br>AIRCRAFT, SUPPORT EQUIPMENT | lcf_lookup      | LCFCODES  | CODE       |               |
| FSCM         |          | VARCHAR2 | 5     |     | NULL     | FEDERAL SUPPLY CODE FOR<br>MANUFACTURERS             | lcf_lookup      | LCFCODES  | CODE       |               |
| NOMEN        |          | VARCHAR2 | 30    |     | NULL     | NOMENCLATURE OF THE END ITEM                         |                 |           |            |               |
| N_ENG        |          | NUMBER   | 1     | 0   | NULL     | NUMBER OF ENGINES ON THE<br>ENDITEM                  |                 |           |            | 0             |
| PART_NO      |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE END ITEM                          | workunit_lookup | PART      | PART_NO    |               |
| SEAT_ARRANGE |          | VARCHAR2 | 1     |     | NULL     | SEAT ARRANGEMENT                                     | lcf_lookup      | LCFCODES  | CODE       |               |
| UOM          |          | VARCHAR2 | 2     |     | NULL     | UNIT OF MEASURE FOR END ITEM<br>USAGE                | lcf_lookup      | LCFCODES  | CODE       |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: OPACTVTY

| Col Name      | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation  | Ref Table | Ref Column | Column Format |
|---------------|----------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE    | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                     |             |           |            |               |
| EI_MODEL      | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                |             |           |            |               |
| EI_ID         | OPEVENT  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER     |             |           |            |               |
| CN_OPN        | OPEVENT  | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL NUMBER               |             |           |            |               |
| SEQ_NO        |          | NUMBER   | 5     | 1   | NOT NULL | SEQUENCE NUMBER                                |             |           |            | 990.9         |
| ACTV_BEG      |          | DATE     | 9     |     | NULL     | BEGIN DATE AND TIME OF THE OPERATIONS ACTIVITY | in_the_past |           |            | YYDDDDHH24MI  |
| ACTV_CODE     |          | VARCHAR2 | 1     |     | NULL     | ACTIVITY CODE                                  | lcf_lookup  | LCFCODES  | CODE       |               |
| ACTV_END      |          | DATE     | 9     |     | NULL     | END DATE AND TIME OF THE OPERATIONS ACTIVITY   | in_the_past |           |            | YYDDDDHH24MI  |
| ACTV_MH       |          | NUMBER   | 5     | 1   | NULL     | ACTIVITY MANHOURS                              |             |           |            | 990.9         |
| DELAY_TYP_OPN |          | VARCHAR2 | 1     |     | NULL     | REASON FOR OPERATIONS DELAY                    | lcf_lookup  | LCFCODES  | CODE       |               |
| DUTY_POS      |          | VARCHAR2 | 2     |     | NULL     | DUTY POSITION FOR THIS ACTIVITY                | lcf_lookup  | LCFCODES  | CODE       |               |
| EVAL_GEAR     |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF GEAR                             | lcf_lookup  | LCFCODES  | CODE       |               |
| EVAL_MANL     |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF MANUALS                          | lcf_lookup  | LCFCODES  | CODE       |               |
| EVAL_MOS      |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF MOS                              | lcf_lookup  | LCFCODES  | CODE       |               |
| EVAL_TRNG     |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF TRAINING                         | lcf_lookup  | LCFCODES  | CODE       |               |
| EVNT_CLASS    |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                   | check const |           |            |               |
| GEAR_USED     |          | VARCHAR2 | 1     |     | NULL     | PERSONNEL GEAR USED                            | lcf_lookup  | LCFCODES  | CODE       |               |
| PID           |          | VARCHAR2 | 6     |     | NULL     | PERSONNEL IDENTIFIER CODE                      | unit_lookup | PEOPLE    | PID        |               |
| SEAT_POS      |          | VARCHAR2 | 1     |     | NULL     | SEAT POSITION                                  | lcf_lookup  | LCFCODES  | CODE       |               |
| TEXT          |          | VARCHAR2 | 2000  |     | NULL     | NARRATIVE TEXT                                 |             |           |            |               |
| TRN_NO        |          | NUMBER   | 2     | 0   | NULL     | TURNAROUND NUMBER                              |             |           |            | 90            |

## UNIRAM Data Dictionary

Report Date: 27-MAR-03  
03086

Table Name: OPAMMO

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |                 |           |            |               |
| EI_MODEL   | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, TS00            |                 |           |            |               |
| EI_ID      | OPEVENT  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |                 |           |            |               |
| CN_OPN     | OPEVENT  | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL NUMBER           |                 |           |            |               |
| SEQ_NO     |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |                 |           |            | 90.9          |
| AMMO_TYP   |          | VARCHAR2 | 3     |     | NULL     | TYPE OF AMMUNITION                         | lcf_lookup      | LCFCODES  | CODE       |               |
| DOWNLOAD   |          | NUMBER   | 4     | 0   | NULL     | AMOUNT OF AMMO DOWNLOADED                  |                 |           |            | 9990          |
| FIRE       |          | NUMBER   | 4     | 0   | NULL     | AMOUNT OF AMMO FIRED                       |                 |           |            | 9990          |
| LOT_DATE   |          | DATE     | 4     |     | NULL     | MONTH AND YEAR LOT WAS MANUFACTURED        | in_the_past     |           |            | MMYY          |
| LOT_NO     |          | VARCHAR2 | 15    |     | NULL     | LOT NUMBER OF THE AMMO                     |                 |           |            |               |
| MSL_RESULT |          | VARCHAR2 | 1     |     | NULL     | RESULT OF FIRING THE MISSLE                | lcf_lookup      | LCFCODES  | CODE       |               |
| MSL_SN     |          | VARCHAR2 | 15    |     | NULL     | SERIAL NUMBER OF THE MISSLE                | alpha_num_check |           |            |               |
| PART_NO    |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE WEAPON                  | workunit_lookup | PART      | PART_NO    |               |
| PART_SN    |          | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE WEAPON                | alpha_num_check |           |            |               |
| POS        | POSITION | VARCHAR2 | 2     |     | NULL     | POSITION OF THE WEAPON                     | workunit_lookup | POSITION  | POS        |               |
| UPLOAD     |          | NUMBER   | 4     | 0   | NULL     | AMOUNT OF AMMO UPLOADED                    |                 |           |            | 9990          |
| WUC        |          | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE WEAPON               | workunit_lookup | WORKUNIT  | WUC        |               |



## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: OPCONFIG

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|------------|-----------|------------|---------------|
| TEST_PHASE | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |            |           |            |               |
| EI_MODEL   | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |            |           |            |               |
| EI_ID      | OPEVENT  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |            |           |            |               |
| CN_OPN     | OPEVENT  | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL NUMBER           |            |           |            |               |
| SEQ_NO     |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |            |           |            | 90.9          |
| ASE_CFG_A  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK A                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_B  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK B                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_C  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK C                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_D  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK D                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_E  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK E                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_F  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK F                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_G  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK G                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_H  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK H                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_I  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK I                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_J  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK J                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_K  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK K                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_L  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK L                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_M  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK M                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_N  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK N                         | lcf_lookup | LCFCODES  | CODE       |               |
| ASE_CFG_O  |          | VARCHAR2 | 1     |     | NULL     | ASE CONFIG BLOCK O                         | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_A  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK A                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_B  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK B                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_C  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK C                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_D  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK D                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_E  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK E                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_F  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK F                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_G  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK G                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_H  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK H                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_I  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK I                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_J  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK J                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_K  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK K                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_L  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK L                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_M  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK M                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_N  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK N                    | lcf_lookup | LCFCODES  | CODE       |               |
| AVN_CFG_O  |          | VARCHAR2 | 1     |     | NULL     | AVIONICS CONFIG BLOCK O                    | lcf_lookup | LCFCODES  | CODE       |               |

Table Name: OPCONFIG

| Col Name  | FmTable | Type     | Width | Dec | Null/Not | Comment                     | Validation | Ref Table | Ref Column | Column Format |
|-----------|---------|----------|-------|-----|----------|-----------------------------|------------|-----------|------------|---------------|
| EIT_CFG_A |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK A     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_B |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK B     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_C |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK C     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_D |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK D     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_E |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK E     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_F |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK F     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_G |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK G     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_H |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK H     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_I |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK I     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_J |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK J     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_K |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK K     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_L |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK L     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_M |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK M     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_N |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK N     | lcf_lookup | LCFCODES  | CODE       |               |
| EIT_CFG_O |         | VARCHAR2 | 1     |     | NULL     | END ITEM CONFIG BLOCK O     | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_A |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK A          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_B |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK B          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_C |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK C          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_D |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK D          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_E |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK E          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_F |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK F          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_G |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK G          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_H |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK H          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_I |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK I          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_J |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK J          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_K |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK K          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_L |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK L          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_M |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK M          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_N |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK N          | lcf_lookup | LCFCODES  | CODE       |               |
| MEP_CFG_O |         | VARCHAR2 | 1     |     | NULL     | MEP CONFIG BLOCK O          | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_A |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK A | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_B |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK B | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_C |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK C | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_D |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK D | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_E |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK E | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_F |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK F | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_G |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK G | lcf_lookup | LCFCODES  | CODE       |               |

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Table Name: OPCONFIG

| Col Name  | FnTable | Type     | Width | Dec | Null/Not | Comment                     | Validation | Ref Table | Ref Column | Column Format |
|-----------|---------|----------|-------|-----|----------|-----------------------------|------------|-----------|------------|---------------|
| NAV_CFG_H |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK H | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_I |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK I | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_J |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK J | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_K |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK K | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_L |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK L | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_M |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK M | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_N |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK N | lcf_lookup | LCFCODES  | CODE       |               |
| NAV_CFG_O |         | VARCHAR2 | 1     |     | NULL     | NAVIGATIONAL CONFIG BLOCK O | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_A |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK A    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_B |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK B    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_C |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK C    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_D |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK D    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_E |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK E    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_F |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK F    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_G |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK G    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_H |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK H    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_I |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK I    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_J |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK J    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_K |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK K    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_L |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK L    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_M |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK M    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_N |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK N    | lcf_lookup | LCFCODES  | CODE       |               |
| VSN_CFG_O |         | VARCHAR2 | 1     |     | NULL     | VISIONICS CONFIG BLOCK O    | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_A |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK A      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_B |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK B      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_C |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK C      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_D |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK D      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_E |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK E      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_F |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK F      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_G |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK G      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_H |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK H      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_I |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK I      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_J |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK J      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_K |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK K      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_L |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK L      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_M |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK M      | lcf_lookup | LCFCODES  | CODE       |               |
| WPN_CFG_N |         | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK N      | lcf_lookup | LCFCODES  | CODE       |               |

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Table Name: OPCONFIG

| Col Name  | FrnTable | Type     | Width | Dec | Null/Not | Comment                | Validation | Ref Table | Ref Column | Column Format |
|-----------|----------|----------|-------|-----|----------|------------------------|------------|-----------|------------|---------------|
| WPN_CFG_O |          | VARCHAR2 | 1     |     | NULL     | WEAPONS CONFIG BLOCK 0 | lcf_lookup | LCFCODES  | CODE       |               |

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Table Name: OPEQUIP

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |                 |           |            |               |
| EI_MODEL   | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>TS00            |                 |           |            |               |
| EI_ID      | OPEVENT  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |                 |           |            |               |
| CN_OPN     | OPEVENT  | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL<br>NUMBER           |                 |           |            |               |
| SEQ_NO     |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                               |                 |           |            | 90.9          |
| EQP_CAT    |          | VARCHAR2 | 1     |     | NULL     | EQUIPMENT CATEGORY                            | lcf_lookup      | LCFCODES  | CODE       |               |
| EQP_ID     |          | VARCHAR2 | 3     |     | NULL     | EQUIPMENT ID                                  | equip_lookup    | EQUIP     | EQP_ID     |               |
| EQP_SN     |          | VARCHAR2 | 10    |     | NULL     | SERIAL NUMBER OF THE<br>EQUIPMENT             | alpha_num_check |           |            |               |
| EVAL_EQP   |          | VARCHAR2 | 1     |     | NULL     | EVALUATION OF EQUIPMENT                       | lcf_lookup      | LCFCODES  | CODE       |               |
| EVNT_CLASS |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                  | check const     |           |            |               |

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Table Name: OPEVENT

| Col Name     | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation   | Ref Table | Ref Column | Column Format |
|--------------|----------|----------|-------|-----|----------|---|--------------|-----------|------------|---------------|
| TEST_PHASE   | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  | test_lookup  | TEST      | TEST_PHASE |               |
| EI_MODEL     | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                   |              |           |            |               |
| EI_ID        | CNTLLOG  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER        |              |           |            |               |
| CN_OPN       | CNTLLOG  | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL NUMBER                  | validate_cn  |           |            |               |
| CN_REF       |          | VARCHAR2 | 12    |     | NULL     | RELATED EVENT CONTROL NUMBER                      | validate_cn  |           |            | 9990.9        |
| EI_BEG_AGE   |          | NUMBER   | 6     | 1   | NULL     | END ITEM AGE WHEN THE EVENT BEGINS                |              |           |            | 9990.9        |
| EI_END_AGE   |          | NUMBER   | 6     | 1   | NULL     | END ITEM AGE WHEN THE EVENT ENDS                  |              |           |            |               |
| EI_SN        |          | VARCHAR2 | 25    |     | NULL     | END ITEM SERIAL NUMBER                            | model_lookup | ENDITEM   | EI_SN      |               |
| EI_TYP       |          | VARCHAR2 | 3     |     | NULL     | TYPE OF END ITEM I.E. AIRCRAFT, SUPPORT EQUIPMENT | model_lookup | MODEL     | EI_TYP     |               |
| ENG1_HIT_CHK |          | VARCHAR2 | 14    |     | NULL     | ENGINE 1 HIT CHECK RESULTS                        |              |           |            |               |
| ENG2_HIT_CHK |          | VARCHAR2 | 14    |     | NULL     | ENGINE 2 HIT CHECK RESULTS                        |              |           |            |               |
| ENG3_HIT_CHK |          | VARCHAR2 | 14    |     | NULL     | ENGINE 3 HIT CHECK RESULTS                        |              |           |            |               |
| ENG4_HIT_CHK |          | VARCHAR2 | 14    |     | NULL     | ENGINE 4 HIT CHECK RESULTS                        |              |           |            |               |
| EVNT_BEG     |          | DATE     | 9     |     | NULL     | BEGIN DATE AND TIME OF THE OPERATIONS EVENT       | in_the_past  |           |            | YYDDDDHH24MI  |
| EVNT_CLASS   |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                      | check const  |           |            |               |
| EVNT_END     |          | DATE     | 9     |     | NULL     | END DATE AND TIME OF THE OPERATIONS EVENT         | in_the_past  |           |            | YYDDDDHH24MI  |
| LAND_NON_STD |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF NON-STANDARD LANDINGS                   |              |           |            | 90            |
| LAND_STD     |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF STANDARD LANDINGS                       |              |           |            | 90            |
| LOC          |          | VARCHAR2 | 4     |     | NULL     | LOCATION OF EVENT ORIGINATION                     | lcf_lookup   | LCFCODES  | CODE       |               |
| OP_EVNT_TYP  |          | VARCHAR2 | 1     |     | NULL     | TYPE OF OPERATIONAL EVENT                         | lcf_lookup   | LCFCODES  | CODE       |               |
| OSCORE1      |          | VARCHAR2 | 1     |     | NULL     | OP SCORE BLOCK 1                                  | lcf_lookup   | LCFCODES  | CODE       |               |
| OSCORE2      |          | VARCHAR2 | 1     |     | NULL     | OP SCORE BLOCK 2                                  | lcf_lookup   | LCFCODES  | CODE       |               |
| PRESSURE     |          | NUMBER   | 5     | 2   | NULL     | BAROMETRIC PRESSURE AT TAKEOFF                    |              |           |            | 90.99         |
| PROFILE1     |          | VARCHAR2 | 1     |     | NULL     | MISSION   | lcf_lookup   | LCFCODES  | CODE       |               |
| PROFILE2     |          | VARCHAR2 | 2     |     | NULL     | CONDITIONS  | lcf_lookup   | LCFCODES  | CODE       |               |
| PROFILE3     |          | VARCHAR2 | 1     |     | NULL     | THEATER OF OPERATIONS                             | lcf_lookup   | LCFCODES  | CODE       |               |
| PROFILE4     |          | VARCHAR2 | 1     |     | NULL     | TERRAIN   | lcf_lookup   | LCFCODES  | CODE       |               |
| PROFILE5     |          | VARCHAR2 | 1     |     | NULL     | GROSS WEIGHT                                      | lcf_lookup   | LCFCODES  | CODE       |               |
| RESULT1      |          | VARCHAR2 | 1     |     | NULL     | OPERATION   | lcf_lookup   | LCFCODES  | CODE       |               |
| RESULT2      |          | VARCHAR2 | 1     |     | NULL     | MISSION   | lcf_lookup   | LCFCODES  | CODE       |               |
| ROTOR_BRKS   |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF ROTOR BRAKE APPLICATIONS                |              |           |            | 90            |

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Table Name: OPEVENT

| Col Name       | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation   | Ref Table | Ref Column | Column Format |
|----------------|----------|----------|-------|-----|----------|--|--------------|-----------|------------|---------------|
| STAT_ARM_OPN   |          | VARCHAR2 | 1     |     | NULL     | ARMAMENT SYSTEM STATUS AT<br>EVENT START   | lcf_lookup   | LCFCODES  | CODE       |               |
| STAT_EI_OPN    |          | VARCHAR2 | 1     |     | NULL     | END ITEM STATUS AT EVENT<br>START          | lcf_lookup   | LCFCODES  | CODE       |               |
| STAT_ELEC_OPN  |          | VARCHAR2 | 1     |     | NULL     | ELECTRICAL SYSTEM STATUS AT<br>EVENT START | lcf_lookup   | LCFCODES  | CODE       |               |
| STAT_OTHER_OPN |          | VARCHAR2 | 1     |     | NULL     | OTHER SYSTEMS STATUS AT<br>EVENT START     | lcf_lookup   | LCFCODES  | CODE       |               |
| TEMPERATURE    |          | NUMBER   | 3     | 0   | NULL     | TEMPERATURE AT TAKEOFF                     |              |           |            | 990           |
| TO_ACTUAL      |          | DATE     | 9     |     | NULL     | ACTUAL DATE AND TIME FOR<br>TAKEOFF        | in_the_past  |           |            | YYDDDDHH24MI  |
| TO_SCHED       |          | DATE     | 9     |     | NULL     | SCHEDULED DATE AND TIME FOR<br>TAKEOFF     | in_the_past  |           |            | YYDDDDHH24MI  |
| TO_WT          |          | NUMBER   | 7     | 0   | NULL     | TOTAL GROSS WEIGHT AT<br>TAKEOFF           |              |           |            | 9999990       |
| UIC_OWEN       |          | VARCHAR2 | 6     |     | NULL     | OWNING UIC                                 | model_lookup | EIDETL    | UIC_OWEN   |               |
| USG_ACTUAL     |          | NUMBER   | 4     | 1   | NULL     | ACTUAL EVENT OPERATING USAGE               |              |           |            | 90.9          |
| USG_SCHED      |          | NUMBER   | 4     | 1   | NULL     | SCHEDULED EVENT OPERATING<br>USAGE         |              |           |            | 90.9          |
| WEATHER        |          | VARCHAR2 | 2     |     | NULL     | PREDOMINANT WEATHER<br>CONDITIONS          | lcf_lookup   | LCFCODES  | CODE       |               |

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Table Name: OPEXPEND

| Col Name    | FnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation   | Ref Table | Ref Column | Column Format |
|-------------|---------|----------|-------|-----|----------|---|--------------|-----------|------------|---------------|
| TEST_PHASE  | OPEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |              |           |            |               |
| EI_MODEL    | OPEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |              |           |            |               |
| EI_ID       | OPEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |              |           |            |               |
| CN_OPN      | OPEVENT | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL<br>NUMBER           |              |           |            |               |
| SEQ_NO      |         | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                               |              |           |            | 90.9          |
| CONSUME_TYP |         | VARCHAR2 | 1     |     | NULL     | EXPENDABLE VS. SERVICE TYPE                   | lcf_lookup   | LCFCODES  | CODE       |               |
| EVNT_CLASS  |         | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                  | check const  |           |            |               |
| EXP_CAT     |         | VARCHAR2 | 1     |     | NULL     | EXPENDABLE CATEGORY                           | lcf_lookup   | LCFCODES  | CODE       |               |
| EXP_ID      |         | VARCHAR2 | 3     |     | NULL     | EXPENDABLE ID                                 | expnd_lookup | EXPND     | EXP_ID     |               |
| LOT_DATE    |         | DATE     | 4     |     | NULL     | MONTH AND YEAR LOT WAS<br>MANUFACTURED        | in_the_past  |           |            | MMYY          |
| LOT_NO      |         | VARCHAR2 | 30    |     | NULL     | LOT NUMBER                                    |              |           |            |               |
| METHOD      |         | VARCHAR2 | 1     |     | NULL     | METHOD USED TO ACCOMPLISH<br>PURPOSE          | lcf_lookup   | LCFCODES  | CODE       |               |
| PURPOSE     |         | VARCHAR2 | 1     |     | NULL     | PURPOSE FOR<br>EXPENDABLE/SERVICE ACTION      | lcf_lookup   | LCFCODES  | CODE       |               |
| QTY         |         | NUMBER   | 4     | 0   | NULL     | QUANTITY OF EXPENDABLE                        |              |           |            | 9990          |
| UOM         |         | VARCHAR2 | 2     |     | NULL     | UNIT OF MEASURE FOR THE<br>EXPENDABLE         | lcf_lookup   | LCFCODES  | CODE       |               |



## UniRAM Data Dictionary

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Table Name: OPLOAD

| Col Name      | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation  | Ref Table | Ref Column | Column Format |
|---------------|----------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE    | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |             |           |            |               |
| EI_MODEL      | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |             |           |            |               |
| EI_ID         | OPEVENT  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |             |           |            |               |
| CN_OPN        | OPEVENT  | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL NUMBER           |             |           |            |               |
| SEQ_NO        |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |             |           |            | 90.9          |
| EXT_WT        |          | NUMBER   | 6     | 0   | NULL     | EXTERNAL WEIGHT                            |             |           |            | 999990        |
| INT_WT        |          | NUMBER   | 6     | 0   | NULL     | INTERNAL WEIGHT                            |             |           |            | 999990        |
| LOAD_BEG      |          | DATE     | 9     |     | NULL     | LOAD BEGIN DATE AND TIME                   | in_the_past |           |            | YYDDDDHH24MI  |
| LOAD_END      |          | DATE     | 9     |     | NULL     | LOAD END DATE AND TIME                     | in_the_past |           |            | YYDDDDHH24MI  |
| LOAD_GROSS_WT |          | NUMBER   | 7     | 0   | NULL     | TOTAL LOAD GROSS WEIGHT                    |             |           |            | 9999990       |
| LOAD_TIME     |          | NUMBER   | 4     | 1   | NULL     | LOAD TIME IN HOURS                         |             |           |            | 90.9          |
| LOAD_TYP      |          | VARCHAR2 | 1     |     | NULL     | TYPE OF LOAD CARRIED                       | lcf_lookup  | LCFCODES  | CODE       |               |
| PAX           |          | NUMBER   | 3     | 0   | NULL     | TOTAL NUMBER OF PASSENGERS                 |             |           |            | 990           |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: OPMEPWEAP

| Col Name    | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation      | Ref Table | Ref Column | Column Format |
|-------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE  | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |                 |           |            |               |
| EI_MODEL    | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |                 |           |            |               |
| EI_ID       | OPEVENT  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |                 |           |            |               |
| CN_OPN      | OPEVENT  | VARCHAR2 | 12    |     | NOT NULL | MAINTENANCE EVENT CONTROL NUMBER           |                 |           |            |               |
| SEQ_NO      |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |                 |           |            | 90.9          |
| DISP        |          | VARCHAR2 | 1     |     | NULL     | ACTUAL DISPOSITION OF THE MEP/WEAPON       | lcf_lookup      | LCFCODES  | CODE       |               |
| EVNT_CLASS  |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS               | check const     |           |            |               |
| PART_NO     |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE MEP/WEAPON              | workunit_lookup | PART      | PART_NO    |               |
| PART_SN     |          | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE MEP/WEAPON            | alpha_num_check |           |            |               |
| PART_SOURCE |          | VARCHAR2 | 1     |     | NULL     | PART SOURCE FOR INSTALLED MEP/WEAPON       | lcf_lookup      | LCFCODES  | CODE       |               |
| POS         |          | VARCHAR2 | 2     |     | NULL     | POSITION OF THE MEP/WEAPON                 | workunit_lookup | POSITION  | POS        |               |
| QTY         |          | NUMBER   | 4     | 0   | NULL     | QUANTITY OF MEP/WEAPON                     |                 |           |            | 9990          |
| WUC         |          | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE MEP/WEAPON           | workunit_lookup | WORKUNIT  | WUC        |               |
| PART_EI_HRS |          | NUMBER   | 6     | 1   | NULL     |  |                 |           |            | 99999.9       |

## UniRAM Data Dictionary

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Table Name: OPREAD

| Col Name       | FnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation      | Ref Table | Ref Column | Column Format |
|----------------|---------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE     | OPEVENT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |                 |           |            |               |
| EI_MODEL       | OPEVENT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |                 |           |            |               |
| EI_ID          | OPEVENT | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |                 |           |            |               |
| CN_OPN         | OPEVENT | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL<br>NUMBER           |                 |           |            |               |
| SEQ_NO         |         | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                               |                 |           |            | 90.9          |
| COMP_HRS       |         | NUMBER   | 8     | 1   | NULL     | COMPONENT HOURS AT TIME OF<br>METER READING   |                 |           |            | 999990.9      |
| DATA_SOURCE    |         | VARCHAR2 | 2     |     | NULL     | DATA SOURCE FOR THE METER<br>READING          | lcf_lookup      | LCFCODES  | CODE       |               |
| EVNT_CLASS     |         | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                  | check const     |           |            |               |
| PART_NO        |         | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE<br>PART/METER              | workunit_lookup | PART      | PART_NO    |               |
| PART_SN        |         | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE<br>PART/METER            | alpha_num_check |           |            |               |
| POS            |         | VARCHAR2 | 2     |     | NULL     | POSITION OF THE PART/METER                    | workunit_lookup | POSITION  | POS        |               |
| READOUT        |         | NUMBER   | 9     | 1   | NULL     | READOUT/INDICATION                            |                 |           |            | 9999990.9     |
| READ_UOM       |         | VARCHAR2 | 2     |     | NULL     | READING UNIT OF MEASURE                       | lcf_lookup      | LCFCODES  | CODE       |               |
| TYPE_INDIC_OPN |         | VARCHAR2 | 1     |     | NULL     | TYPE OF INDICATION                            | lcf_lookup      | LCFCODES  | CODE       |               |
| WUC            |         | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE<br>PART/METER           | workunit_lookup | WORKUNIT  | WUC        |               |

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Table Name: OPRUN

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation  | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |             |           |            |               |
| EI_MODEL   | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |             |           |            |               |
| EI_ID      | OPEVENT  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |             |           |            |               |
| CN_OPN     | OPEVENT  | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL NUMBER           |             |           |            |               |
| SEQ_NO     |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |             |           |            | 90.9          |
| APU_PURP1  |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR AIR POWER                     | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP2  |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR ELECTRICAL POWER              | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP3  |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR HYDRAULIC POWER               | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP4  |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR ENVIRONMENTAL POWER           | lcf_lookup  | LCFCODES  | CODE       |               |
| ENG_NUM    |          | NUMBER   | 1     | 0   | NULL     | ENGINE NUMBER                              |             |           |            | 0             |
| EVNT_CLASS |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS               | check const |           |            |               |
| RUN_BEG    |          | DATE     | 9     |     | NULL     | BEGIN DATE AND TIME FOR OPERATIONAL RUN    | in_the_past |           |            | YYDDDDHH24MI  |
| RUN_END    |          | DATE     | 9     |     | NULL     | END DATE AND TIME FOR OPERATIONAL RUN      | in_the_past |           |            | YYDDDDHH24MI  |
| RUN_TYP    |          | VARCHAR2 | 2     |     | NULL     | TYPE OF OPERATIONAL RUN                    |             |           |            |               |
| RUN_USG    |          | NUMBER   | 4     | 1   | NULL     | TOTAL RUN USAGE                            | lcf_lookup  | LCFCODES  | CODE       | 90.9          |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: OPRUNSM

| Col Name       | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation  | Ref Table | Ref Column | Column Format |
|----------------|----------|----------|-------|-----|----------|---|-------------|-----------|------------|---------------|
| TEST_PHASE     | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  |             |           |            |               |
| EI_MODEL       | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800                    |             |           |            |               |
| EI_ID          | OPEVENT  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER         |             |           |            |               |
| CN_OPN         | OPEVENT  | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL<br>NUMBER                   |             |           |            |               |
| APU_AIR_START  |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES THE APU WAS<br>STARTED IN THE AIR     |             |           |            | 90            |
| APU_GND_START  |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES THE APU WAS<br>STARTED ON THE GROUND  |             |           |            | 90            |
| APU_PURP1      |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR AIR POWER                                | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP2      |          | VARCHAR2 | 1     |     | NULL     | APU USED PRO ELECTRICAL<br>POWER                      | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP3      |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR HYDRAULIC POWER                          | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_PURP4      |          | VARCHAR2 | 1     |     | NULL     | APU USED FOR ENVIRONMENTAL<br>POWER                   | lcf_lookup  | LCFCODES  | CODE       |               |
| APU_USG        |          | NUMBER   | 4     | 1   | NULL     | TOTAL APU USAGE                                       |             |           |            | 90.9          |
| ENG1_AIR_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 1 WAS<br>STARTED IN THE AIR    |             |           |            | 90            |
| ENG1_GND_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 1 WAS<br>STARTED ON THE GROUND |             |           |            | 90            |
| ENG1_USG       |          | NUMBER   | 4     | 1   | NULL     | TOTAL ENGINE 1 USAGE                                  |             |           |            | 90.9          |
| ENG2_AIR_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 2 WAS<br>STARTED IN THE AIR    |             |           |            | 90            |
| ENG2_GND_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 2 WAS<br>STARTED ON THE GROUND |             |           |            | 90            |
| ENG2_USG       |          | NUMBER   | 4     | 1   | NULL     | TOTAL ENGINE 2 USAGE                                  |             |           |            | 90.9          |
| ENG3_AIR_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 3 WAS<br>STARTED IN THE AIR    |             |           |            | 90            |
| ENG3_GND_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 3 WAS<br>STARTED ON THE GROUND |             |           |            | 90            |
| ENG3_USG       |          | NUMBER   | 4     | 1   | NULL     | TOTAL ENGINE 3 USAGE                                  |             |           |            | 90.9          |
| ENG4_AIR_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 4 WAS<br>STARTED IN THE AIR    |             |           |            | 90            |
| ENG4_GND_START |          | NUMBER   | 2     | 0   | NULL     | NUMBER OF TIMES ENGINE 4 WAS<br>STARTED ON THE GROUND |             |           |            | 90            |
| ENG4_USG       |          | NUMBER   | 4     | 1   | NULL     | TOTAL ENGINE 4 USAGE                                  |             |           |            | 90.9          |
| EVNT_CLASS     |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS                          | check const |           |            |               |

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Table Name: OPTTEXT

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| TEST_PHASE | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |            |           |            |               |
| EI_MODEL   | OPEVENT  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |            |           |            |               |
| EI_ID      | OPEVENT  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |            |           |            |               |
| CN_OPN     | OPEVENT  | VARCHAR2 | 12    |     | NOT NULL | OPERATIONAL EVENT CONTROL<br>NUMBER           |            |           |            |               |
| TEXT_TYP   |          | VARCHAR2 | 1     |     | NOT NULL | TYPE OF TEXT                                  | lcf_lookup | LCFCODES  | CODE       |               |
| TEXT       |          | VARCHAR2 | 4000  |     | NULL     | NARRATIVE TEXT                                |            |           |            |               |

## UnIRAM Data Dictionary

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Table Name: PART

| Col Name      | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|---------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE    | WORKUNIT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |                 |           |            |               |
| EI_MODEL      | WORKUNIT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                          |                 |           |            |               |
| WUC           | WORKUNIT | VARCHAR2 | 15    |     | NOT NULL | WORK UNIT CODE OF THE PART                               |                 |           |            |               |
| PART_NO       |          | VARCHAR2 | 20    |     | NOT NULL | PART NUMBER OF THE PART                                  |                 |           |            |               |
| CURR_COST     |          | NUMBER   | 11    | 2   | NULL     | COST TO ACQUIRE PART WITH CURRENT NSN                    |                 |           |            | 999999990.99  |
| CURR_NSN      |          | VARCHAR2 | 13    |     | NULL     | CURRENT NSN OF THE PART                                  | alpha_num_check |           |            |               |
| DASH16_ITM    |          | VARCHAR2 | 1     |     | NULL     | INDICATES 2408-16/2410 PART                              | check const     |           |            |               |
| EICONFIG_ITM  |          | VARCHAR2 | 1     |     | NULL     | INDICATES PART IS TRACKED IN EICONFIG TABLE              | check const     |           |            |               |
| ESS_CURR_NSN  |          | VARCHAR2 | 1     |     | NULL     | ESSENTIALITY OF CURRENT NSN                              | lcf_lookup      | LCFCODES  | CODE       |               |
| ESS_PRIME_NSN |          | VARCHAR2 | 1     |     | NULL     | ESSENTIALITY OF PRIME NSN                                | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA1          |          | VARCHAR2 | 1     |     | NULL     | MATERIEL CATEGORY OF THE PART                            | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA2          |          | VARCHAR2 | 1     |     | NULL     | APPROPRIATION AND BUDGET ACTIVITY ACCOUNT OF THE PART    | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA3          |          | VARCHAR2 | 1     |     | NULL     | MANAGEMENT INVENTORY SEGMENT OF THE PART                 | lcf_lookup      | LCFCODES  | CODE       |               |
| FIA45         |          | VARCHAR2 | 2     |     | NULL     | SPECIFIC GROUP/GENERIC GROUP OF THE PART                 | lcf_lookup      | LCFCODES  | CODE       |               |
| FLT_SFTY_ITM  |          | VARCHAR2 | 1     |     | NULL     | INDICATES FLIGHT SAFETY PART                             | check const     |           |            |               |
| FSCM          |          | VARCHAR2 | 5     |     | NULL     | FEDERAL SUPPLY CODE FOR MANUFACTURERS                    | lcf_lookup      | LCFCODES  | CODE       |               |
| FURNISHED     |          | VARCHAR2 | 1     |     | NULL     | INDICATES WHO FURNISHES THE PART                         | lcf_lookup      | LCFCODES  | CODE       |               |
| LRM_ITM       |          | VARCHAR2 | 1     |     | NULL     | INDICATES LINE REPLACEABLE MODULE                        | check const     |           |            |               |
| LRU_ITM       |          | VARCHAR2 | 1     |     | NULL     | INDICATES LINE REPLACEABLE UNIT                          | check const     |           |            |               |
| NOMEN         |          | VARCHAR2 | 30    |     | NULL     | NOMENCLATURE OF THE PART                                 |                 |           |            |               |
| NSN           |          | VARCHAR2 | 13    |     | NULL     | NSN OF THE PART  | alpha_num_check |           |            | 999999990.99  |
| PRIME_COST    |          | NUMBER   | 11    | 2   | NULL     | COST TO ACQUIRE PART WITH PRIME NSN                      |                 |           |            |               |
| PRIME_NSN     |          | VARCHAR2 | 13    |     | NULL     | PRIME NSN OF THE PART                                    | alpha_num_check |           |            | 990           |
| QTY_EI        |          | NUMBER   | 3     | 0   | NULL     | PART QUANTITY PER ENDITEM                                |                 |           |            |               |
| RPSTL_ITM     |          | VARCHAR2 | 1     |     | NULL     | INDICATES PART IS ON REPAIR PARTS AND SPECIAL TOOLS LIST | check const     |           |            |               |
| SERIAL_ITM    |          | VARCHAR2 | 1     |     | NULL     | INDICATES PART IS A SERIALIZED ITEM                      | check const     |           |            |               |
| SMR12         |          | VARCHAR2 | 2     |     | NULL     | SOURCE CODE OF THE PART                                  | lcf_lookup      | LCFCODES  | CODE       |               |
| SMR3          |          | VARCHAR2 | 1     |     | NULL     | LOWEST MAINT LEVEL FOR REMOVE, REPLACE, USE OF THE PART  | lcf_lookup      | LCFCODES  | CODE       |               |
| SMR4          |          | VARCHAR2 | 1     |     | NULL     | LOWEST MAINT LEVEL FOR COMPLETE REPAIR OF THE PART       | lcf_lookup      | LCFCODES  | CODE       |               |

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Table Name: PART

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation  | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|-------------|-----------|------------|---------------|
| SMR5       |          | VARCHAR2 | 1     |     | NULL     | RECOVERABILITY CODE OF THE PART                           | lcf_lookup  | LCFCODES  | CODE       |               |
| SRC_SUPPLY |          | VARCHAR2 | 3     |     | NULL     | SOURCE OF SUPPLY OF THE PART                              | lcf_lookup  | LCFCODES  | CODE       |               |
| SRU_ITM    |          | VARCHAR2 | 1     |     | NULL     | INDICATES SUPPORT REPLACEABLE UNIT                        | check const |           |            |               |
| TASNA_ITM  |          | VARCHAR2 | 1     |     | NULL     | INDICATES TASNA (AIMIX) PART                              | check const |           |            |               |
| UOI        |          | VARCHAR2 | 2     |     | NULL     | SMALLEST QTY OF PART THAT CAN BE REQUISITIONED AND ISSUED | lcf_lookup  | LCFCODES  | CODE       |               |
| UOM        |          | VARCHAR2 | 2     |     | NULL     | UNIT OF MEASURE OF THE PART                               | lcf_lookup  | LCFCODES  | CODE       |               |
| WARR_ITM   |          | VARCHAR2 | 1     |     | NULL     | INDICATES PART UNDER WARRANTY                             | check const |           |            |               |



## UniRAM Data Dictionary

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Table Name: PATCH

| Col Name     | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation  | Ref Table | Ref Column | Column Format |
|--------------|----------|----------|-------|-----|----------|---|-------------|-----------|------------|---------------|
| TEST_PHASE   | SOFTWARE | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  |             |           |            |               |
| EI_MODEL     | SOFTWARE | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800                                    |             |           |            |               |
| WUC          | SOFTWARE | VARCHAR2 | 15    |     | NOT NULL | WORK UNIT CODE FOR THE HW<br>THAT SF IS INSTALLED ON OR<br>OWN        |             |           |            |               |
| PART_NO      | SOFTWARE | VARCHAR2 | 20    |     | NOT NULL | PART NUMBER FOR THE HW THAT<br>THE SOFTWARE IS INSTALLED ON<br>OR OWN |             |           |            |               |
| SFTW_VER_NO  | SOFTWARE | VARCHAR2 | 20    |     | NOT NULL | SOFTWARE VERSION NUMBER   |             |           |            |               |
| PATCH        |          | VARCHAR2 | 2     |     | NOT NULL | SOFTWARE PATCH  |             |           |            |               |
| WHEN_RELEASE |          | DATE     | 5     |     | NULL     | DATE OF PATCH RELEASE   | in_the_past |           |            | YYDDD         |

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Table Name: PEODETL

| Col Name      | FnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation  | Ref Table | Ref Column | Column Format |
|---------------|---------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE    | PEOPLE  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |             |           |            |               |
| UIC           | PEOPLE  | VARCHAR2 | 6     |     | NOT NULL | UNIT IDENTIFIER CODE                       |             |           |            |               |
| PID           | PEOPLE  | VARCHAR2 | 6     |     | NOT NULL | PERSONNEL IDENTIFIER CODE                  |             |           |            |               |
| PID_BEG       |         | DATE     | 9     |     | NOT NULL | PIC BEGIN DATE AND TIME                    |             |           |            | YYDDDDHH24MI  |
| GRADE         |         | VARCHAR2 | 4     |     | NULL     | GRADE OF THE INDIVIDUAL IDENTIFIED         | lcf_lookup  | LCFCODES  | CODE       |               |
| MOS1          |         | VARCHAR2 | 5     |     | NULL     | PRIMARY MILITARY OCCUPATIONAL SPECIALITY   | lcf_lookup  | LCFCODES  | CODE       |               |
| MOS1_TRAINING |         | VARCHAR2 | 1     |     | NULL     | TRAINING METHOD FOR PRIMARY MOS            | lcf_lookup  | LCFCODES  | CODE       |               |
| MOS2          |         | VARCHAR2 | 5     |     | NULL     | SECONDARY MILITARY OCCUPATIONAL SPECIALITY | lcf_lookup  | LCFCODES  | CODE       |               |
| MOS2_TRAINING |         | VARCHAR2 | 1     |     | NULL     | TRAINING METHOD FOR SECONDARY MOS          | lcf_lookup  | LCFCODES  | CODE       |               |
| MOS3          |         | VARCHAR2 | 5     |     | NULL     | DUTY MILITARY OCCUPATIONAL SPECIALITY      | lcf_lookup  | LCFCODES  | CODE       |               |
| MOS3_TRAINING |         | VARCHAR2 | 1     |     | NULL     | TRAINING METHOD FOR DUTY MOS               | lcf_lookup  | LCFCODES  | CODE       |               |
| PID_END       |         | DATE     | 9     |     | NULL     | PIC END DATE AND TIME                      | in_the_past |           |            | YYDDDDHH24MI  |
| WHEN_GRADE    |         | DATE     | 5     |     | NULL     | DATE GRADE WAS ACQUIRED                    | in_the_past |           |            | YYDDD         |
| WHEN_MOS1     |         | DATE     | 5     |     | NULL     | DATE PRIMARY MOS WAS ACQUIRED              | in_the_past |           |            | YYDDD         |
| WHEN_MOS2     |         | DATE     | 5     |     | NULL     | DATE SECONDARY MOS WAS ACQUIRED            | in_the_past |           |            | YYDDD         |
| WHEN_MOS3     |         | DATE     | 5     |     | NULL     | DATE DUTY MOS WAS ACQUIRED                 | in_the_past |           |            | YYDDD         |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: PEOPLE

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                     | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| TEST_PHASE | UNIT     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                  |            |           |            |               |
| UIC        | UNIT     | VARCHAR2 | 6     |     | NOT NULL | UNIT IDENTIFIER CODE                        |            |           |            |               |
| PID        |          | VARCHAR2 | 6     |     | NOT NULL | PERSONNEL IDENTIFIER CODE                   |            |           |            |               |
| FIRST_NAME |          | VARCHAR2 | 30    |     | NULL     | FIRST NAME OF THE INDIVIDUAL IDENTIFIED     |            |           |            |               |
| LAST_NAME  |          | VARCHAR2 | 30    |     | NULL     | LAST NAME OF THE INDIVIDUAL IDENTIFIED      |            |           |            |               |
| MID_INIT   |          | VARCHAR2 | 1     |     | NULL     | MIDDLE INITIAL OF THE INDIVIDUAL IDENTIFIED |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: POSITION

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                               | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---------------------------------------|------------|-----------|------------|---------------|
| TEST_PHASE | WORKUNIT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                            |            |           |            |               |
| EI_MODEL   | WORKUNIT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>TS00    |            |           |            |               |
| WUC        | WORKUNIT | VARCHAR2 | 15    |     | NOT NULL | WORK UNIT CODE OF THE PART            |            |           |            |               |
| POS        |          | VARCHAR2 | 2     |     | NOT NULL | POSITION OF THE PART ON ITS<br>PARENT | lcf_lookup | LCFCODES  | CODE       |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
03086

Table Name: READETL

| Col Name    | FinTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation      | Ref Table | Ref Column | Column Format |
|-------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE  | READING  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |                 |           |            |               |
| EI_MODEL    | READING  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |                 |           |            |               |
| EI_ID       | READING  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |                 |           |            |               |
| CN_RED      | READING  | VARCHAR2 | 12    |     | NOT NULL | READING EVENT CONTROL NUMBER               |                 |           |            |               |
| SEQ_NO      |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |                 |           |            | 90.9          |
| COMP_HRS    |          | NUMBER   | 8     | 1   | NULL     | COMPONENT HOURS AT TIME OF METER READING   |                 |           |            | 999990.9      |
| DATA_SOURCE |          | VARCHAR2 | 2     |     | NULL     | DATA SOURCE FOR THE METER READING          | lcf_lookup      | LCFCODES  | CODE       |               |
| EVNT_CLASS  |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS               | check const     |           |            |               |
| PART_NO     |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE PART/METER              | workunit_lookup | PART      | PART_NO    |               |
| PART_SN     |          | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE PART/METER            | alpha_num_check |           |            |               |
| POS         |          | VARCHAR2 | 2     |     | NULL     | POSITION OF THE PART/METER                 | workunit_lookup | POSITION  | POS        |               |
| READOUT     |          | NUMBER   | 9     | 1   | NULL     | READOUT/INDICATION                         |                 |           |            | 9999990.9     |
| READ_UOM    |          | VARCHAR2 | 2     |     | NULL     | READING UNIT OF MEASURE                    | lcf_lookup      | LCFCODES  | CODE       |               |
| TYPE_INDIC  |          | VARCHAR2 | 1     |     | NULL     | TYPE OF INDICATION                         | lcf_lookup      | LCFCODES  | CODE       |               |
| WUC         |          | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE PART/METER           | workunit_lookup | WORKUNIT  | WUC        |               |

## UnIRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: POSITION

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                               | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---------------------------------------|------------|-----------|------------|---------------|
| TEST_PHASE | WORKUNIT | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                            |            |           |            |               |
| EL_MODEL   | WORKUNIT | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800    |            |           |            |               |
| WUC        | WORKUNIT | VARCHAR2 | 15    |     | NOT NULL | WORK UNIT CODE OF THE PART            |            |           |            |               |
| POS        |          | VARCHAR2 | 2     |     | NOT NULL | POSITION OF THE PART ON ITS<br>PARENT | lcf_lookup | LCFCODES  | CODE       |               |

## UnIRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: READETL

| Col Name    | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation      | Ref Table | Ref Column | Column Format |
|-------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE  | READING  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                 |                 |           |            |               |
| EI_MODEL    | READING  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800            |                 |           |            |               |
| EI_ID       | READING  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER |                 |           |            |               |
| CN_RED      | READING  | VARCHAR2 | 12    |     | NOT NULL | READING EVENT CONTROL NUMBER               |                 |           |            |               |
| SEQ_NO      |          | NUMBER   | 4     | 1   | NOT NULL | SEQUENCE NUMBER                            |                 |           |            | 90.9          |
| COMP_HRS    |          | NUMBER   | 8     | 1   | NULL     | COMPONENT HOURS AT TIME OF METER READING   |                 |           |            | 999990.9      |
| DATA_SOURCE |          | VARCHAR2 | 2     |     | NULL     | DATA SOURCE FOR THE METER READING          | lcf_lookup      | LCFCODES  | CODE       |               |
| EVNT_CLASS  |          | VARCHAR2 | 1     |     | NULL     | EVENT CLASS FOR COMMON VIEWS               | check const     |           |            |               |
| PART_NO     |          | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE PART/METER              | workunit_lookup | PART      | PART_NO    |               |
| PART_SN     |          | VARCHAR2 | 20    |     | NULL     | SERIAL NUMBER OF THE PART/METER            | alpha_num_check |           |            |               |
| POS         |          | VARCHAR2 | 2     |     | NULL     | POSITION OF THE PART/METER                 | workunit_lookup | POSITION  | POS        |               |
| READOUT     |          | NUMBER   | 9     | 1   | NULL     | READOUT/INDICATION                         |                 |           |            | 9999990.9     |
| READ_UOM    |          | VARCHAR2 | 2     |     | NULL     | READING UNIT OF MEASURE                    | lcf_lookup      | LCFCODES  | CODE       |               |
| TYPE_INDIC  |          | VARCHAR2 | 1     |     | NULL     | TYPE OF INDICATION                         | lcf_lookup      | LCFCODES  | CODE       |               |
| WUC         |          | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE PART/METER           | workunit_lookup | WORKUNIT  | WUC        |               |

## UnIRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: READING

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation   | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|--------------|-----------|------------|---------------|
| TEST_PHASE | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   | test_lookup  | TEST      | TEST_PHASE |               |
| EI_MODEL   | CNTLLOG  | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800                   |              |           |            |               |
| EI_ID      | CNTLLOG  | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER        |              |           |            |               |
| CN_RED     | CNTLLOG  | VARCHAR2 | 12    |     | NOT NULL | READING EVENT CONTROL NUMBER                         | validate_cn  |           |            |               |
| EI_SN      |          | VARCHAR2 | 25    |     | NULL     | END ITEM SERIAL NUMBER                               | model_lookup | ENDITEM   | EI_SN      |               |
| EI_TYP     |          | VARCHAR2 | 3     |     | NULL     | TYPE OF END ITEM I.E.<br>AIRCRAFT, SUPPORT EQUIPMENT | model_lookup | MODEL     | EI_TYP     |               |
| UIC_OWN    |          | VARCHAR2 | 6     |     | NULL     | OWNING UIC   | model_lookup | EIDETL    | UIC_OWN    |               |



Table Name: SKIPEDIT

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment           | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|-------------------|------------|-----------|------------|---------------|
| TEST_PHASE | TEST     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE        |            |           |            |               |
| MODULE     |          | VARCHAR2 | 5     |     | NOT NULL | MODULE/TABLE NAME | sys_lookup | SYS_CODES | CODE       |               |
| EDIT_LEVEL |          | VARCHAR2 | 2     |     | NOT NULL | EDIT LEVEL        | sys_lookup | SYS_CODES | CODE       |               |
| EDIT001    |          | VARCHAR2 | 1     |     | NULL     | EDIT 001 OR 1     | sys_lookup | SYS_CODES | CODE       |               |
| EDIT002    |          | VARCHAR2 | 1     |     | NULL     | EDIT 002 OR 2     | sys_lookup | SYS_CODES | CODE       |               |
| EDIT003    |          | VARCHAR2 | 1     |     | NULL     | EDIT 003 OR 3     | sys_lookup | SYS_CODES | CODE       |               |
| EDIT004    |          | VARCHAR2 | 1     |     | NULL     | EDIT 004 OR 4     | sys_lookup | SYS_CODES | CODE       |               |
| EDIT005    |          | VARCHAR2 | 1     |     | NULL     | EDIT 005 OR 5     | sys_lookup | SYS_CODES | CODE       |               |
| EDIT006    |          | VARCHAR2 | 1     |     | NULL     | EDIT 006 OR 6     | sys_lookup | SYS_CODES | CODE       |               |
| EDIT007    |          | VARCHAR2 | 1     |     | NULL     | EDIT 007 OR 7     | sys_lookup | SYS_CODES | CODE       |               |
| EDIT008    |          | VARCHAR2 | 1     |     | NULL     | EDIT 008 OR 8     | sys_lookup | SYS_CODES | CODE       |               |
| EDIT009    |          | VARCHAR2 | 1     |     | NULL     | EDIT 009 OR 9     | sys_lookup | SYS_CODES | CODE       |               |
| EDIT010    |          | VARCHAR2 | 1     |     | NULL     | EDIT 010 OR 10    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT011    |          | VARCHAR2 | 1     |     | NULL     | EDIT 011 OR 11    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT012    |          | VARCHAR2 | 1     |     | NULL     | EDIT 012 OR 12    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT013    |          | VARCHAR2 | 1     |     | NULL     | EDIT 013 OR 13    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT014    |          | VARCHAR2 | 1     |     | NULL     | EDIT 014 OR 14    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT015    |          | VARCHAR2 | 1     |     | NULL     | EDIT 015 OR 15    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT016    |          | VARCHAR2 | 1     |     | NULL     | EDIT 016 OR 16    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT017    |          | VARCHAR2 | 1     |     | NULL     | EDIT 017 OR 17    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT018    |          | VARCHAR2 | 1     |     | NULL     | EDIT 018 OR 18    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT019    |          | VARCHAR2 | 1     |     | NULL     | EDIT 019 OR 19    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT020    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT021    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT022    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT023    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT024    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT025    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT026    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT027    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT028    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT029    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT030    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT031    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT032    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT033    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |
| EDIT034    |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20    | sys_lookup | SYS_CODES | CODE       |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: SKIPEEDIT

| Col Name | FrnTable | Type     | Width | Dec | Null/Not | Comment        | Validation | Ref Table | Ref Column | Column Format |
|----------|----------|----------|-------|-----|----------|----------------|------------|-----------|------------|---------------|
| EDIT035  |          | VARCHAR2 | 1     |     | NULL     | EDIT 020 OR 20 | sys_lookup | SYSCODES  | CODE       |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: SOFTWARE

| Col Name     | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation  | Ref Table | Ref Column | Column Format |
|--------------|----------|----------|-------|-----|----------|--|-------------|-----------|------------|---------------|
| TEST_PHASE   | PART     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   |             |           |            |               |
| EI_MODEL     | PART     | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800                             |             |           |            |               |
| WUC          | PART     | VARCHAR2 | 15    |     | NOT NULL | WORK UNIT CODE FOR THE HW<br>THAT SF IS INSTALLED ON OR<br>OWN |             |           |            |               |
| PART_NO      | PART     | VARCHAR2 | 20    |     | NOT NULL | PART NUMBER FOR THE HW THAT<br>SF IS INSTALLED ON OR OWN       |             |           |            |               |
| SFTW_VER_NO  |          | VARCHAR2 | 20    |     | NOT NULL | SOFTWARE VERSION NUMBER  |             |           |            |               |
| FSCM         |          | VARCHAR2 | 5     |     | NULL     | FEDERAL SUPPLY CODE FOR<br>MANUFACTURERS                       | lcf_lookup  | LCFCODES  | CODE       |               |
| WARR_ITM     |          | VARCHAR2 | 1     |     | NULL     | INDICATES SOFTWARE UNDER<br>WARRANTY                           | check const |           |            |               |
| WHEN_RELEASE |          | DATE     | 5     |     | NULL     | DATE OF SOFTWARE RELEASE                                       | in_the_past |           |            | YYDDD         |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: SUPPLY

| Col Name      | FnTable | Type     | Width | Dec | Null/Not | Comment   | Validation      | Ref Table | Ref Column | Column Format |
|---------------|---------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE    | ENDITEM | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE  | test_lookup     | TEST      | TEST_PHASE |               |
| EI_MODEL      | ENDITEM | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A, T800                   |                 |           |            |               |
| EI_ID         | ENDITEM | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM SERIAL NUMBER        |                 |           |            |               |
| CN_REF        |         | VARCHAR2 | 12    |     | NOT NULL | RELATED EVENT CONTROL NUMBER                      | validate_cn     |           |            |               |
| DR_NUM        |         | VARCHAR2 | 14    |     | NOT NULL | SUPPLY SYSTEM DOCUMENT REGISTER NUMBER            |                 |           |            |               |
| EI_SN         |         | VARCHAR2 | 25    |     | NULL     | END ITEM SERIAL NUMBER                            | model_lookup    | ENDITEM   | EI_SN      |               |
| EI_TYP        |         | VARCHAR2 | 3     |     | NULL     | TYPE OF END ITEM I.E. AIRCRAFT, SUPPORT EQUIPMENT | model_lookup    | MODEL     | EI_TYP     |               |
| NSN           |         | VARCHAR2 | 13    |     | NULL     | NSN OF THE PART                                   | alpha_num_check |           |            |               |
| ORDERED_FROM  |         | VARCHAR2 | 6     |     | NULL     | DODAAC/UIC/FSCM ORDERED FROM                      |                 |           |            |               |
| PART_NO       |         | VARCHAR2 | 20    |     | NULL     | PART NUMBER OF THE PART                           |                 |           |            |               |
| PRIORITY      |         | VARCHAR2 | 2     |     | NULL     | PRIORITY OF THE SUPPLY ACTION                     | lcf_lookup      | LCFCODES  | CODE       |               |
| QTY           |         | NUMBER   | 3     | 0   | NULL     | QUANTITY OF PARTS                                 |                 |           |            | 990           |
| RECEIVED_FROM |         | VARCHAR2 | 6     |     | NULL     | DODAAC/UIC/FSCM RECEIVED FROM                     |                 |           |            |               |
| REQ_TYP       |         | VARCHAR2 | 3     |     | NULL     | REQUEST TYPE                                      | lcf_lookup      | LCFCODES  | CODE       |               |
| TASK_NO_REF   |         | NUMBER   | 3     | 0   | NULL     | RELATED TASK NUMBER                               |                 |           |            | 990           |
| TEXT          |         | VARCHAR2 | 2000  |     | NULL     | NARRATIVE TEXT                                    |                 |           |            |               |
| UIC_OWEN      |         | VARCHAR2 | 6     |     | NULL     | OWNING UIC  | model_lookup    | EIDETL    | UIC_OWEN   |               |
| WHEN_REC      |         | DATE     | 9     |     | NULL     | DATE AND TIME OF THE RECEIPT                      | in_the_past     |           |            | YYDDDDHH24MI  |
| WHEN_REQ      |         | DATE     | 9     |     | NULL     | DATE AND TIME OF THE REQUEST                      | in_the_past     |           |            | YYDDDDHH24MI  |
| WHY_ORDERED   |         | VARCHAR2 | 2     |     | NULL     | REASON FOR THE ORDER I.E. PLL, ASL, TAIL NUMBER   | lcf_lookup      | LCFCODES  | CODE       |               |
| WUC           |         | VARCHAR2 | 15    |     | NULL     | WORK UNIT CODE OF THE PART                        | workunit_lookup | WORKUNIT  | WUC        |               |

## UniRAM Data Dictionary

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Table Name: SYSCODES

| Col Name | FrnTable | Type     | Width | Dec | Null/Not | Comment      | Validation | Ref Table | Ref Column | Column Format |
|----------|----------|----------|-------|-----|----------|--------------|------------|-----------|------------|---------------|
| CODE_TYP |          | VARCHAR2 | 15    |     | NOT NULL | CODE NAME    |            |           |            |               |
| CODE     |          | VARCHAR2 | 15    |     | NOT NULL | CODE VALUE   |            |           |            |               |
| MEANING  |          | VARCHAR2 | 60    |     | NULL     | CODE MEANING |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TEST

| Col Name    | FnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|-------------|---------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE  |         | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   | alpha_num_check |           |            |               |
| AGENCY      |         | VARCHAR2 | 2000  |     | NULL     | TEST AGENCY  |                 |           |            |               |
| AUDIT_AVL   |         | VARCHAR2 | 1     |     | NULL     | AUDITING TURNED ON FOR<br>AVAILABILITY EVENTS      | check const     |           |            |               |
| AUDIT_MNT   |         | VARCHAR2 | 1     |     | NULL     | AUDITING TURNED ON FOR<br>MAINTENANCE EVENTS       | check const     |           |            |               |
| AUDIT_OPN   |         | VARCHAR2 | 1     |     | NULL     | AUDITING TURNED ON FOR<br>OPERATIONAL EVENTS       | check const     |           |            |               |
| AUDIT_RED   |         | VARCHAR2 | 1     |     | NULL     | AUDITING TURNED ON FOR<br>READING EVENTS           | check const     |           |            |               |
| AUDIT_REF   |         | VARCHAR2 | 1     |     | NULL     | AUDITING TURNED ON FOR<br>REFERENCE TABLES         | check const     |           |            |               |
| MODULE_A    |         | VARCHAR2 | 1     |     | NULL     | AVAILABILITY MODULE USED<br>THIS TEST              | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_ED   |         | VARCHAR2 | 1     |     | NULL     | APU/ENGINE DETAIL RUN MODULE<br>USED THIS TEST     | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_ES   |         | VARCHAR2 | 1     |     | NULL     | APU/ENGINE SUMMARY RUN<br>MODULE USED THIS TEST    | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_MA   |         | VARCHAR2 | 1     |     | NULL     | ACTION MODULE USED THIS TEST                       | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_ME   |         | VARCHAR2 | 1     |     | NULL     | MAINTENANCE EVENT SUMMARY<br>MODULE USED THIS TEST | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_MM   |         | VARCHAR2 | 1     |     | NULL     | MONITORING MODULE USED THIS<br>TEST                | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_MT   |         | VARCHAR2 | 1     |     | NULL     | TASK MODULE USED THIS TEST                         | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_N    |         | VARCHAR2 | 1     |     | NULL     | NARRATIVE/TEXT MODULE USED<br>THIS TEST            | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_OA   |         | VARCHAR2 | 1     |     | NULL     | ACTIVITY MODULE USED THIS<br>TEST                  | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_OC   |         | VARCHAR2 | 1     |     | NULL     | CONFIGURATION MODULE USED<br>THIS TEST             | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_OE   |         | VARCHAR2 | 1     |     | NULL     | OPERATIONAL EVENT SUMMARY<br>MODULE USED THIS TEST | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_OL   |         | VARCHAR2 | 1     |     | NULL     | LOAD MODULE USED USED THIS<br>TEST                 | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_OW   |         | VARCHAR2 | 1     |     | NULL     | WEAPON/AMMO MODULE USED THIS<br>TEST               | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_P    |         | VARCHAR2 | 1     |     | NULL     | PART UTILIZATION MODULE USED<br>THIS TEST          | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_Q    |         | VARCHAR2 | 1     |     | NULL     | EQUIPMENT/TOOL MODULE USED<br>THIS TEST            | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_R    |         | VARCHAR2 | 1     |     | NULL     | READING MODULE USED THIS<br>TEST                   | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_S    |         | VARCHAR2 | 1     |     | NULL     | SUPPLY MODULE USED THIS TEST                       | sys_lookup      |           | SYSCODES   | CODE          |
| MODULE_X    |         | VARCHAR2 | 1     |     | NULL     | EXPENDABLE/SERVICE MODULE<br>USED THIS TEST        | sys_lookup      |           | SYSCODES   | CODE          |
| NOMEN       |         | VARCHAR2 | 30    |     | NULL     | NOMENCLATURE OF THE TEST<br>PHASE                  |                 |           |            |               |
| PROJECT_NUM |         | VARCHAR2 | 16    |     | NULL     | TEST PROJECT NUMBER                                |                 |           |            |               |
| SPONSOR     |         | VARCHAR2 | 2000  |     | NULL     | TEST SPONSOR                                       |                 |           |            |               |

## UnIRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TEST

| Col Name | FrnTable | Type     | Width | Dec | Null/Not | Comment                        | Validation  | Ref Table | Ref Column | Column Format |
|----------|----------|----------|-------|-----|----------|--------------------------------|-------------|-----------|------------|---------------|
| TEST_BEG |          | DATE     | 9     |     | NULL     | TEST PHASE BEGIN DATE AND TIME |             |           |            | YYDDDDHH24MI  |
| TEST_END |          | DATE     | 9     |     | NULL     | TEST PHASE END DATE AND TIME   | in_the_past |           |            | YYDDDDHH24MI  |
| TEXT     |          | VARCHAR2 | 2000  |     | NULL     | NARRATIVE TEXT                 |             |           |            |               |

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Table Name: TIMESLICE

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                       | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---|-----------------|-----------|------------|---------------|
| TEST_PHASE |          | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                    |                 |           |            |               |
| EI_MODEL   |          | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800            |                 |           |            |               |
| EI_ID      |          | VARCHAR2 | 3     |     | NOT NULL | ABBREVIATED FORM OF END ITEM<br>SERIAL NUMBER |                 |           |            |               |
| CN         |          | VARCHAR2 | 12    |     | NOT NULL | EVENT CONTROL NUMBER                          |                 |           |            |               |
| TASK_NO    |          | NUMBER   | 3     | 0   | NOT NULL | MAINTENANCE TASK NUMBER                       |                 |           |            | 990           |
| SLICE_BEG  |          | DATE     |       |     | NOT NULL | BEGIN DATE AND TIME FOR THIS<br>SLICE OF TIME |                 |           |            |               |
| USERNAME   |          | VARCHAR2 | 30    |     | NOT NULL | ORACLE USER NAME                              | alpha_num_check |           |            |               |
| DELAY_TYP  |          | VARCHAR2 | 1     |     | NULL     | REASON FOR DELAY                              |                 |           |            |               |
| SLICE_END  |          | DATE     |       |     | NULL     | END DATE AND TIME FOR THIS<br>SLICE OF TIME   |                 |           |            |               |
| SLICE_HRS  |          | NUMBER   | 7     | 1   | NULL     | HOURS FOR THIS SLICE OF TIME                  |                 |           |            | 99990.9       |



## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TIRACTN

| Col Name    | FnTable | Type     | Width | Dec | Null/Not | Comment   | Validation | Ref Table | Ref Column | Column Format |
|-------------|---------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| TEST_PROJ#  | TIRDATA | VARCHAR2 | 20    |     | NOT NULL | Block 3: Test Project Number  |            | TIRTEST   | TEST_PROJ# |               |
| TIRPRFX     | TIRDATA | VARCHAR2 | 5     |     | NOT NULL | FIRST FIVE CHARACTER OF TIR#  |            | TIRTEST   | TIRPRFX    |               |
| TIR#        | TIRDATA | VARCHAR2 | 10    |     | NOT NULL | Block 4: TIR Number   |            | TIRLOG    | TIR#       |               |
| TIR_REV     | TIRDATA | VARCHAR2 | 2     |     | NOT NULL | Block 1-2: TIR Revision Number  |            | TIRLOG    | TIR_REV    |               |
| CA_STATUS   |         | VARCHAR2 | 10    |     | NULL     | Block 100: STATUS OF CORRECTIVE ACTION OF TIR.                        |            | TIRCODES  | CODE_TYPE  |               |
| ASGD_RESP   |         | VARCHAR2 | 18    |     | NULL     | Block 101: ASSIGNED RESPONSIBILITY ORGNAZITION FOR CORRECTIVE ACTION. |            | TIRCODES  | CODE_TYPE  |               |
| CA_DATE     |         | DATE     | 11    |     | NULL     | Block 102: DATE OF CORRECTIVE ACTION OF TIR                           |            |           |            | DD MON YYYY   |
| CA_ANALYSIS |         | VARCHAR2 | 2000  |     | NULL     | Block 120: DEVELOPER'S ANALYSIS OF PROBLEM                            |            |           |            |               |
| CA_DESC     |         | VARCHAR2 | 2000  |     | NULL     | Block 121: DESCRIPTION OF CORRECTIVE ACTION OF TIR.                   |            |           |            |               |
| CA_RESULT   |         | VARCHAR2 | 2000  |     | NULL     | Block 122: TEST RESULT ON CORRECTIVE ACTION.                          |            |           |            |               |
| CA_IMPL     |         | VARCHAR2 | 2000  |     | NULL     | Block 123: PLANNED PRODUCTION IMPLEMENTATION.                         |            |           |            |               |

## UnIRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TIRCODES

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                              | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--------------------------------------|------------|-----------|------------|---------------|
| TEST_PROJ# | TIRTEST  | VARCHAR2 | 20    |     | NOT NULL | TIR TEST PROJECT NUMBER              |            | TIRTEST   | TEST_PROJ# |               |
| TIRPRFX    | TIRTEST  | VARCHAR2 | 5     |     | NOT NULL | TIR NUMBER PREFIX                    |            | TIRTEST   | TEST_PROJ# |               |
| CODE_VALUE |          | VARCHAR2 | 50    |     | NOT NULL | TIR SPECIFIC CODE VALUE FROM DA 73-1 |            |           |            |               |
| CODE_TYPE  |          | VARCHAR2 | 30    |     | NOT NULL | TIR CODE TYPE FROM DA 73-1           |            |           |            |               |
| BLOCK_ID   |          | NUMBER   | 3     |     | NULL     | BLOCK NAME<br>TIR Block Number       |            |           |            |               |

Table Name: TIRDATA

| Col Name      | FnTable  | Type     | Width | Dec | Null/Not | Comment  | Validation | Ref Table | Ref Column  | Column Format |
|---------------|----------|----------|-------|-----|----------|--|------------|-----------|-------------|---------------|
| TEST_PROJ#    | TIRLOG   | VARCHAR2 | 20    |     | NOT NULL | Block 3: TEST PROJECT NUMBER   |            | TIRTEST   | TEST_PROJ#  |               |
| TIRPRFX       | TIRLOG   | VARCHAR2 | 5     |     | NOT NULL | FIRST FIVE CHARACTER OF TIR#   |            | TIRTEST   | TIRPRFX     |               |
| TIR#          | TIRLOG   | VARCHAR2 | 10    |     | NOT NULL | Block 4: TIR NUMBER FOR EACH TEST INCIDENT REPORT                            |            | TIRLOG    | TIR#        |               |
| TIR_REV       | TIRLOG   | VARCHAR2 | 2     |     | NOT NULL | Block 1-2: TIR REVISION  |            | TIRLOG    | TIR_REV     |               |
| CATGRY_1      | VARCHAR2 | VARCHAR2 | 14    |     | NULL     | Block 46-1: Category 1 or Test Issues  |            | TIRCODES  | CODE_TYPE   |               |
| CATGRY_2      | VARCHAR2 | VARCHAR2 | 14    |     | NULL     | Block 46-2: Category 2 or Test Issues  |            | TIRCODES  | CODE_TYPE   |               |
| CATGRY_3      | VARCHAR2 | VARCHAR2 | 14    |     | NULL     | Block 46-3: Category 3 or Test Issues  |            | TIRCODES  | CODE_TYPE   |               |
| CATGRY_4      | VARCHAR2 | VARCHAR2 | 14    |     | NULL     | Block 46-4: Category 4 or Test Issues  |            | TIRCODES  | CODE_TYPE   |               |
| CHARGEABILITY | VARCHAR2 | VARCHAR2 | 18    |     | NULL     | Block 43: FD/SC chargeability of TIR   |            | TIRCODES  | CODE_TYPE   |               |
| COMDR_NAME    | VARCHAR2 | VARCHAR2 | 34    |     | NULL     | Block 99-1: Commander's Name   |            | TIRSIGN   | COMDR_NAME  |               |
| COMDR_PHONE   | VARCHAR2 | VARCHAR2 | 34    |     | NULL     | Block 99-3: Commander's Phone  |            | TIRSIGN   | COMDR_PHONE |               |
| COMDR_TITLE   | VARCHAR2 | VARCHAR2 | 34    |     | NULL     | Block 99-2: Commander's Title  |            | TIRSIGN   | COMDR_TITLE |               |
| CONTRACT#     | VARCHAR2 | VARCHAR2 | 22    |     | NULL     | Block 14: Major Item Contract Number   |            | TIREI     | CONTRACT#   |               |
| CORR_ACTION#  | NUMBER   | NUMBER   | 34    |     | NULL     | Block 45: Corrective Action Number (reserved for ATIR)                       |            |           |             |               |
| DG_CLKHRS     | VARCHAR2 | VARCHAR2 | 7     |     | NULL     | Block 70: Diagnostic Clockhour   |            |           |             |               |
| DG_MANHRS     | VARCHAR2 | VARCHAR2 | 7     |     | NULL     | Block 71: Diagnostic Man Hours   |            |           |             |               |
| DISPOSITION   | VARCHAR2 | VARCHAR2 | 59    |     | NULL     | Block 49: Disp of Failed or defective Material of TIR                        |            | TIRCODES  | CODE_TYPE   |               |
| FD_SC_CLASS   | VARCHAR2 | VARCHAR2 | 20    |     | NULL     | Block 42: Scoring Class of TIR   |            | TIRCODES  | CODE_TYPE   |               |
| FD_SC_STEP#   | VARCHAR2 | VARCHAR2 | 20    |     | NULL     | Block 41: Scoring Step Number of TIR   |            | TIRCODES  | CODE_TYPE   |               |
| FSN_NSN       | VARCHAR2 | VARCHAR2 | 24    |     | NULL     | Block 52: Federal/National Stock Number                                      |            | TIRPN     | FSN_NSN     |               |
| INC_ACTION    | VARCHAR2 | VARCHAR2 | 25    |     | NULL     | Block 34: Incident Action  |            | TIRCODES  | CODE_TYPE   |               |
| INC_CLASS     | VARCHAR2 | VARCHAR2 | 12    |     | NULL     | Block 32: Incident Class   |            | TIRCODES  | CODE_TYPE   |               |
| INC_DATE      | DATE     | DATE     | 16    |     | NULL     | Block 40-1&2: Incident Date and Time   |            |           |             | DD MON YYYY   |
| INC_STATUS    | VARCHAR2 | VARCHAR2 | 12    |     | NULL     | Block 44: Incident Status i.e. PRELIMINARY, SCORED OR ASSESSED               |            | TIRCODES  | CODE_TYPE   | HH24MI        |
| INC_TMZONE    | VARCHAR2 | VARCHAR2 | 3     |     | NULL     | Block 40-3: Incident Time Zone   |            | TIRCODES  | CODE_TYPE   |               |
| ISD_ACTION    | VARCHAR2 | VARCHAR2 | 25    |     | NULL     | Block 57: Incident Subject Action or Part Action (Required if Sect III Used) |            | TIRCODES  | CODE_TYPE   |               |
| ISD_DRWG#     | VARCHAR2 | VARCHAR2 | 23    |     | NULL     | Block 55: ISD Drawing Number   |            |           |             |               |

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Table Name: TIRDATA

| Col Name      | FnTable | Type     | Width | Dec | Null/Not | Comment  | Validation | Ref Table | Ref Column  | Column Format |
|---------------|---------|----------|-------|-----|----------|--|------------|-----------|-------------|---------------|
| ISD_FGC       |         | VARCHAR2 | 28    |     | NULL     | Block 60: Functional Group Code                          |            | TIRWUC    | WUC         |               |
| ISD_LSA       |         | VARCHAR2 | 27    |     | NULL     | Block 61: LSA Control Number for Incident Subject        |            | TIRPN     | LSA_NUM     |               |
| ISD_MFR_NAME  |         | VARCHAR2 | 28    |     | NULL     | Block 53: Manufacturer Name                              |            | TIRPN     | MFR_NAME    |               |
| ISD_MFR_PART# |         | VARCHAR2 | 22    |     | NULL     | Block 54: Manufacturer Part Number                       |            | TIRPN     | MFR_PART_NO |               |
| ISD_NAME      |         | VARCHAR2 | 27    |     | NULL     | Block 50: Incident Subject Name                          |            | TIRPN     | NOMEN       |               |
| ISD_QTY       |         | NUMBER   | 10    |     | NULL     | Block 56: Quantity of Incident Subject or Part           |            |           |             |               |
| ISD_SERIAL#   |         | VARCHAR2 | 24    |     | NULL     | Block 51: Serial No of Incident Subject or Part          |            |           |             |               |
| ITEM_NUM      |         | VARCHAR2 | 26    |     | NULL     | Block 15: Code assigned to End Item                      |            | TIRMODEL  | ITEM_NUM    |               |
| KEYWORD_1     |         | VARCHAR2 | 14    |     | NULL     | Block 47-1: Primary Keywords describing TIR              |            | TIRCODES  | CODE_TYPE   |               |
| KEYWORD_2     |         | VARCHAR2 | 14    |     | NULL     | Block 47-2: Primary Keywords describing TIR              |            | TIRCODES  | CODE_TYPE   |               |
| KEYWORD_3     |         | VARCHAR2 | 14    |     | NULL     | Block 47-3: Primary Keywords describing TIR              |            | TIRCODES  | CODE_TYPE   |               |
| KEYWORD_4     |         | VARCHAR2 | 14    |     | NULL     | Block 47-4: Primary Keywords describing TIR              |            | TIRCODES  | CODE_TYPE   |               |
| MFR_NAME      |         | VARCHAR2 | 28    |     | NULL     | Block 13: End Item Manufacturer Name                     |            | TIRMODEL  | MFR_NAME    |               |
| MNT_LVL_USED  |         | VARCHAR2 | 21    |     | NULL     | Block 81: TIR Maintenance Level Used                     |            | TIRCODES  | CODE_TYPE   |               |
| MNT_LVL_PRSC  |         | VARCHAR2 | 21    |     | NULL     | Block 82: TIR Maintenance Level Prescribed               |            | TIRCODES  | CODE_TYPE   |               |
| MNT_LVL_RECMD |         | VARCHAR2 | 21    |     | NULL     | Block 83: TIR Maintenance Level Recommended              |            | TIRCODES  | CODE_TYPE   |               |
| MNT_TYPE      |         | VARCHAR2 | 27    |     | NULL     | Block 80: TIR Maintenance Type                           |            | TIRCODES  | CODE_TYPE   |               |
| MODEL_EI      |         | VARCHAR2 | 26    |     | NULL     | Block 10: End Item Model Name                            |            | TIRMODEL  | MODEL_EI    |               |
| NXT_ASM       |         | VARCHAR2 | 22    |     | NULL     | Block 65: Next Higher Assembly of Incident Subject       |            | TIRWUC    | WUC         |               |
| NXT_ASM_SRL#  |         | VARCHAR2 | 24    |     | NULL     | Block 66: Next Higher Assembly Serial Number of ISD Part |            |           |             |               |
| OBSVD_DUR     |         | VARCHAR2 | 16    |     | NULL     | Block 33: TIR Incident Observed during.                  |            | TIRCODES  | CODE_TYPE   |               |
| ORIG_REL_DATE |         | DATE     | 6     |     | NULL     | Block 8: Original TIR Release Date                       |            |           |             | YYMMDD        |
| PART_LIFE1    |         | VARCHAR2 | 10    |     | NULL     | Block 62-1: Part Item Life Span                          |            |           |             |               |
| PART_LIFE2    |         | VARCHAR2 | 10    |     | NULL     | Block 63-1: Part Item Life Span                          |            |           |             |               |
| PART_LIFE3    |         | VARCHAR2 | 10    |     | NULL     | Block 64-1: Part Item Life Span                          |            |           |             |               |
| PART_UNIT#    |         | VARCHAR2 | 15    |     | NULL     | Block 62-2: PART UNIT FOR                                |            | TIRCODES  | CODE_TYPE   |               |

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Table Name: TIRDATA

| Col Name       | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation | Ref Table | Ref Column | Column Format |
|----------------|----------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| PART_UNIT2     |          | VARCHAR2 | 15    |     | NULL     | RESPECTIVE LIFE<br>Block 63-2: PART UNIT FOR<br>RESPECTIVE LIFE |            | TIRCODES  | CODE_TYPE  |               |
| PART_UNIT3     |          | VARCHAR2 | 15    |     | NULL     | Block 64-2: PART UNIT FOR<br>RESPECTIVE LIFE                    |            | TIRCODES  | CODE_TYPE  |               |
| PREP_NAME      |          | VARCHAR2 | 34    |     | NULL     | Block 98-1: TIR Preparer<br>Name                                |            | TIRSIGN   | PREP_NAME  |               |
| PREP_PHONE     |          | VARCHAR2 | 34    |     | NULL     | Block 98-3: TIR Preparer<br>Phone                               |            | TIRSIGN   | PREP_PHONE |               |
| PREP_TITLE     |          | VARCHAR2 | 34    |     | NULL     | Block 98-2: TIR Preparer<br>Title                               |            | TIRSIGN   | PREP_TITLE |               |
| REL_DATE       |          | DATE     | 11    |     | NULL     | Block 1: TIR Release Date<br>(20 char including REV# 99)        |            |           |            | DD MON YYYY   |
| SERIAL#        |          | VARCHAR2 | 24    |     | NULL     | Block 11: TIR End Item<br>Serial Number                         |            |           |            |               |
| SOFTWARE_VER#  |          | VARCHAR2 | 14    |     | NULL     | Block 67: Software version<br>of Incident Subject.              |            |           |            |               |
| SUBSYSTEM      |          | VARCHAR2 | 22    |     | NULL     | Block 31: TIR Incident<br>Subsystem Name                        |            |           |            |               |
| TEST_COND1N    |          | VARCHAR2 | 16    |     | NULL     | Block 48-3: Test Environment<br>Condition                       |            | TIRCODES  | CODE_TYPE  |               |
| TEST_ENVMT     |          | VARCHAR2 | 32    |     | NULL     | Block 48-1: Test Environment<br>at Incident Time.               |            | TIRCODES  | CODE_TYPE  |               |
| TEST_LIFE1     |          | VARCHAR2 | 10    |     | NULL     | Block 21-1: MAJOR ITEM LIFE<br>SPAN                             |            |           |            |               |
| TEST_LIFE2     |          | VARCHAR2 | 10    |     | NULL     | Block 22-1: MAJOR ITEM LIFE<br>SPAN                             |            |           |            |               |
| TEST_LIFE3     |          | VARCHAR2 | 10    |     | NULL     | Block 23-1: MAJOR ITEM LIFE<br>SPAN                             |            |           |            |               |
| TEST_LIFE4     |          | VARCHAR2 | 10    |     | NULL     | Block 24-1: MAJOR ITEM LIFE<br>SPAN                             |            |           |            |               |
| TEST_LIFE5     |          | VARCHAR2 | 10    |     | NULL     | Block 25-1: TEST LIFE OF END<br>ITEM                            |            |           |            |               |
| TEST_TYPE      |          | VARCHAR2 | 22    |     | NULL     | Block 48-2: TIR Test<br>Environment Type                        |            | TIRCODES  | CODE_TYPE  |               |
| TEST_UNIT1     |          | VARCHAR2 | 15    |     | NULL     | Block 21-2: MAJOR ITEM UNIT<br>FOR RESPECTIVE LIFE              |            | TIRCODES  | CODE_TYPE  |               |
| TEST_UNIT2     |          | VARCHAR2 | 15    |     | NULL     | Block 22-2: MAJOR ITEM UNIT<br>FOR RESPECTIVE LIFE              |            | TIRCODES  | CODE_TYPE  |               |
| TEST_UNIT3     |          | VARCHAR2 | 15    |     | NULL     | Block 23-2: MAJOR ITEM UNIT<br>FOR RESPECTIVE LIFE              |            | TIRCODES  | CODE_TYPE  |               |
| TEST_UNIT4     |          | VARCHAR2 | 15    |     | NULL     | Block 24-2: MAJOR ITEM UNIT<br>FOR RESPECTIVE LIFE              |            | TIRCODES  | CODE_TYPE  |               |
| TEST_UNIT5     |          | VARCHAR2 | 15    |     | NULL     | Block 25-2: UNIT FOR TEST<br>LIFE5 OF END ITEM                  |            | TIRCODES  | CODE_TYPE  |               |
| TIR_MESSAGE    |          | VARCHAR2 | 72    |     | NULL     | TIR MESSAGE   |            |           |            |               |
| TIR_TITLE      | TIRLOG   | VARCHAR2 | 26    |     | NULL     | Block 30: TIR Title   |            | TIRLOG    | TIR_TITLE  |               |
| TTL_MNT_CLKHRS |          | VARCHAR2 | 7     |     | NULL     | Block 90: Total Maintenance<br>Clockhours                       |            |           |            |               |
| TTL_MNT_MANHRS |          | VARCHAR2 | 7     |     | NULL     | Block 90: Total Maintenance                                     |            |           |            |               |

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Table Name: TIRDATA

| Col Name | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation | Ref Table | Ref Column | Column Format |
|----------|----------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| USA#     |          | VARCHAR2 | 27    |     | NULL     | Man hours<br>Block 12: End Item USA<br>Registration Number. |            | TIREI     | USA#       |               |

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Report Date: 27-MAR-03  
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Table Name: TIRDSRPT

| Col Name     | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation | Ref Table | Ref Column | Column Format |
|--------------|----------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| TEST_PROJ#   | TIRTEST  | VARCHAR2 | 20    |     | NOT NULL | TEST PROJECT NUMBER                                 |            | TIRTEST   | TEST_PROJ# |               |
| TIRPRFX      | TIRTEST  | VARCHAR2 | 5     |     | NOT NULL | TIR PREFIX  |            | TIRTEST   | TIRPRFX    |               |
| TIR#         | TIRLOG   | VARCHAR2 | 10    |     | NOT NULL | TIR NUMBER  |            | TIRLOG    | TIR#       |               |
| TIR_REV      | TIRLOG   | VARCHAR2 | 2     |     | NOT NULL | TIR REVISION  |            | TIRLOG    | TIR_REV    |               |
| DATA_ITEM    |          | NUMBER   |       |     | NULL     | ATIRS DATA STREAM HEADER<br>DATA ITEM               |            |           |            |               |
| MARKINGS     |          | NUMBER   |       |     | NULL     | ATIRS DATA STREAM HEADER<br>CLASSIFICATION MARKINGS |            |           |            |               |
| VERSION#     |          | NUMBER   |       |     | NULL     | ATIRS DATA STREAM HEADER<br>VERSION NUMBER          |            |           |            |               |
| SENDER_DATE  |          | DATE     |       |     | NULL     | DATE WHEN TIR IS GENERATED<br>FOR SENDING           |            |           |            |               |
| SENDER_NAME  | TIRSIGN  | VARCHAR2 | 20    |     | NULL     | TIR SENDERS NAME                                    |            | TIRSIGN   | SIGNNAME   |               |
| SENDER_PHONE |          | VARCHAR2 | 20    |     | NULL     | TIR SENDERS PHONE NUMBER                            |            |           |            |               |
| SENDER_EMAIL |          | VARCHAR2 | 78    |     | NULL     | TIR SENDERS EMAIL ADDRESS                           |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TIREI

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                             | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|-------------------------------------|------------|-----------|------------|---------------|
| TEST_PROJ# | TIRMODEL | VARCHAR2 | 20    |     | NOT NULL | TEST PROJECT NUMBER FOR END<br>ITEM |            | TIRMODEL  | TIRMODEL   |               |
| TIRPREFIX  | TIRMODEL | VARCHAR2 | 5     |     | NOT NULL | TIR PREFIX                          |            | TIRMODEL  | TIRPREFIX  |               |
| MODEL_EI   | TIRMODEL | VARCHAR2 | 26    |     | NOT NULL | END ITEM MODEL                      |            | TIRMODEL  | MODEL_EI   |               |
| SERIAL#    |          | VARCHAR2 | 24    |     | NOT NULL | END ITEM SERIAL NUMBER              |            |           |            |               |
| CONTRACT#  |          | VARCHAR2 | 22    |     | NULL     | END ITEM CONTRACT NUMBER            |            |           |            |               |
| ITEM_NUM   |          | VARCHAR2 | 26    |     | NULL     | END ITEM ITEM NUMBER                |            |           |            |               |
| USA#       |          | VARCHAR2 | 27    |     | NULL     | END ITEM USA NUMBER                 |            |           |            |               |
| REMARKS    |          | VARCHAR2 | 2000  |     | NULL     | END ITEM REMARKS                    |            |           |            |               |



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Table Name: TIRGENUS

| Col Name      | FrnTable | Type     | Width | Dec | Null/Not | Comment                               | Validation | Ref Table | Ref Column | Column Format |
|---------------|----------|----------|-------|-----|----------|---------------------------------------|------------|-----------|------------|---------------|
| TEST_PROJ#    | TIRTEST  | VARCHAR2 | 20    |     | NOT NULL | TEST PROJECT NUMBER                   |            | TIRTEST   | TEST_PROJ# |               |
| TIRPRFX       | TIRTEST  | VARCHAR2 | 5     |     | NOT NULL | TIR PREFIX                            |            | TIRTEST   | TIRPRFX    |               |
| TABLE_NAME    |          | VARCHAR2 | 15    |     | NOT NULL | TABLE NAME TO GENERATE<br>VALUES FOR  |            |           |            |               |
| COLUMN_NAME   |          | VARCHAR2 | 30    |     | NOT NULL | COLUMN NAME TO GENERATE<br>VALUES FOR |            |           |            |               |
| BLOCK_ID      |          | NUMBER   | 3     |     | NULL     | TIR BLOCK ID NUMBER                   |            |           |            |               |
| GENERIC_USAGE |          | VARCHAR2 | 4     |     | NULL     | GENERIC USAGE VALUES                  |            |           |            |               |

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Table Name: TIRLOG

| Col Name    | FnTable | Type     | Width | Dec | Null/Not | Comment  | Validation | Ref Table | Ref Column | Column Format |
|-------------|---------|----------|-------|-----|----------|--|------------|-----------|------------|---------------|
| TEST_PROJ#  | TIRTEST | VARCHAR2 | 20    |     | NOT NULL | Test Project Number  |            | TIRTEST   | TEST_PROJ# |               |
| TIRPRFX     | TIRTEST | VARCHAR2 | 5     |     | NOT NULL | FIRST FIVE CHARACTER OF TIR#                                       |            | TIRTEST   | TIRPRFX    |               |
| TIR#        |         | VARCHAR2 | 10    |     | NOT NULL | TIR Number   |            |           |            |               |
| TIR_REV     |         | VARCHAR2 | 2     |     | NOT NULL | TIR Revision Number  |            |           |            |               |
| CN          |         | VARCHAR2 | 12    |     | NULL     | Control Number from Uniram<br>for each Test Incident               |            |           |            |               |
| MARK_COMP   |         | CHAR     | 1     |     | NULL     | TIR Marked Complete?   |            |           |            |               |
| EI_MODEL    |         | VARCHAR2 | 6     |     | NULL     | Uniram End Item Model  |            |           |            |               |
| EI_ID       |         | VARCHAR2 | 3     |     | NULL     | Uniram End Item ID (End Item<br>Identifier)                        |            |           |            |               |
| ORIGIN_DATE |         | DATE     | 7     |     | NULL     | Original TIR Date from<br>Revision 0                               |            |           |            |               |
| REL_DATE    |         | DATE     | 7     |     | NULL     | Release Date of TIR  |            |           |            |               |
| REL_NAME    |         | VARCHAR2 | 30    |     | NULL     | User Name Who Released the<br>Completed TIR                        |            |           |            |               |
| RPT_DATE    |         | DATE     | 7     |     | NULL     | Test Incident Report<br>Generation Date (When<br>Xmitted to ATIRS) |            |           |            |               |
| TEST_PHASE  |         | VARCHAR2 | 6     |     | NULL     | Uniram Test Phase  |            |           |            |               |
| TIR_MESSAGE |         | VARCHAR2 | 72    |     | NULL     | TIR MESSAGE  |            |           |            |               |
| TIRTITLE    |         | VARCHAR2 | 26    |     | NULL     | Block 2: TIR Title   |            |           |            |               |

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Table Name: TIRMODEL

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                         | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|---------------------------------|------------|-----------|------------|---------------|
| TEST_PROJ# | TIRTEST  | VARCHAR2 | 20    |     | NOT NULL | TEST PROJECT NUMBER             |            | TIRTEST   | TEST_PROJ# |               |
| TIRPRFX    | TIRTEST  | VARCHAR2 | 5     |     | NOT NULL | TIR PREFIX                      |            | TIRTEST   | TIRPRFX    |               |
| MODEL_EI   |          | VARCHAR2 | 26    |     | NOT NULL | END ITEM MODEL                  |            |           |            |               |
| MFR_NAME   |          | VARCHAR2 | 28    |     | NULL     | MODEL MANUFACTURERS NAME        |            |           |            |               |
| REMARKS    |          | VARCHAR2 | 2000  |     | NULL     | REMARKS PERTAINING TO THE MODEL |            |           |            |               |

## UniRAM Data Dictionary

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Table Name: TIRMTB

| Col Name       | FrnTable | Type     | Width | Dec | Null/Not | Comment   | Validation | Ref Table | Ref Column | Column Format |
|----------------|----------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| TEST_PROJ#     | TIRDATA  | VARCHAR2 | 20    |     | NOT NULL | Block 3: Test Project Number for each TIR                     |            | TIRTEST   | TEST_PROJ# |               |
| TIR#           | TIRDATA  | VARCHAR2 | 10    |     | NOT NULL | Block 4: TIR Number   |            | TIRLOG    | TIR#       |               |
| TIR_REV        | TIRDATA  | VARCHAR2 | 2     |     | NOT NULL | Block 1-2: TIR Revision Number                                |            | TIRLOG    | TIR_REV    |               |
| MNT_SEQ        |          | NUMBER   | 3     | 1   | NOT NULL | Block 90: Maintenance Sequence Number for each TIR            |            |           |            | 99.9          |
| APPL           |          | CHAR     | 1     |     | NULL     | Block 90: Applicable or Not Applicable                        | Y,N        | TIRCODES  | CODE_TYPE  | YYMMDD        |
| DATE_END       |          | DATE     | 6     |     | NULL     | Block 90: Date maintenance ended for defective or failed part |            |           |            | YYMMDD        |
| DATE_START     |          | DATE     | 6     |     | NULL     | Block 90: Date Maintenance Started for each part              |            |           |            | YYMMDD        |
| DELAY_HRS      |          | VARCHAR2 | 6     |     | NULL     | Block 90: Administrative and Logistic Delay Hours             |            |           |            | HHH:MM        |
| DG_CLKHRS      |          | VARCHAR2 | 6     |     | NULL     | Block 90: Diagnostic Clock Hours of part                      |            |           |            | HHH:MM        |
| DG_MHRS        |          | VARCHAR2 | 6     |     | NULL     | Block 90: Diagnostic Man-hours for part                       |            |           |            | HHH:MM        |
| LEVEL_90       |          | VARCHAR2 | 5     |     | NULL     | Block 90: Maintenance Level                                   |            | TIRCODES  | CODE_TYPE  |               |
| MNT_TYPE_90    |          | VARCHAR2 | 4     |     | NULL     | Block 90: Maintenance Type                                    |            | TIRCODES  | CODE_TYPE  |               |
| TIME_END       |          | VARCHAR2 | 4     |     | NULL     | Block 90: Maintenance Time Ended                              |            |           |            | 9999          |
| TIME_START     |          | VARCHAR2 | 4     |     | NULL     | Block 90: Maintenance Time Started                            |            |           |            | 9999          |
| TTL_MNT_CLKHRS |          | VARCHAR2 | 6     |     | NULL     | Block 90: Total Maintenance Clock Hours                       |            |           |            | HHH:MM        |
| TTL_MNT_MHRS   |          | VARCHAR2 | 6     |     | NULL     | Block 90: Total Maintenance Man hours                         |            |           |            | HHH:MM        |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TIRPART

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|------------|-----------|------------|---------------|
| TEST_PROJ# | TIRDATA  | VARCHAR2 | 20    |     | NOT NULL | Block 3: Test Project Number                     |            | TIRTEST   | TEST_PROJ# |               |
| TIRPREFIX  | TIRDATA  | VARCHAR2 | 5     |     | NOT NULL | FIRST FIVE CHARACTER OF TIR#                     |            | TIRTEST   | TIRPREFIX  |               |
| TIR#       | TIRDATA  | VARCHAR2 | 10    |     | NOT NULL | Block 4: TIR Number                              |            | TIRLOG    | TIR#       |               |
| TIR_REV    | TIRDATA  | VARCHAR2 | 2     |     | NOT NULL | Block 1-2: TIR Revision Number                   |            | TIRLOG    | TIR_REV    |               |
| PART_SEQ   |          | NUMBER   | 3     | 1   | NOT NULL | Administrative Part Sequence Number for Block 90 |            |           |            | 99.9          |
| ACTION     |          | VARCHAR2 | 7     |     | NULL     | Block 90: Part Action                            |            | TIRCODES  | CODE_TYPE  |               |
| FGC        |          | VARCHAR2 | 4     |     | NULL     | Block 90: Part Functional Group Code             |            | TIRWUC    | WUC        |               |
| FSN_NSN    |          | VARCHAR2 | 24    |     | NULL     | Block 90: Part FSN/NSN                           |            | TIRPN     | PART_NO    |               |
| LEVEL_PART |          | VARCHAR2 | 4     |     | NULL     | Block 90: Part Maintenance Level                 |            | TIRCODES  | CODE_TYPE  |               |
| MFR_PART#  |          | VARCHAR2 | 22    |     | NULL     | Block 90: Part Manufacturer's Part Number        |            | TIRPN     | PART_NO    |               |
| NOMEN      |          | VARCHAR2 | 19    |     | NULL     | Block 90: Part Nomenclature                      |            |           |            |               |
| PART_LIFE  |          | VARCHAR2 | 7     |     | NULL     | Block 90: Part Life                              |            |           |            |               |
| QTY        |          | NUMBER   | 4     |     | NULL     | Block 90: Part Quantity                          |            |           |            | 9999          |
| SERIAL#    |          | VARCHAR2 | 24    |     | NULL     | Block 90: Part Serial Number                     |            |           |            |               |

## UniRAM Data Dictionary

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Table Name: TIRSCODE

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                     | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|-----------------------------|------------|-----------|------------|---------------|
| TEST_PROJ# | TIRTEST  | VARCHAR2 | 20    |     | NOT NULL | GENERIC TEST PROJECT NUMBER |            | TIRTEST   | TEST_PROJ# |               |
| TIRPRFX    | TIRTEST  | VARCHAR2 | 5     |     | NOT NULL | GENERIC TIR PREFIX          |            | TIRTEST   | TIRPRFX    |               |
| CODE_VALUE |          | VARCHAR2 | 50    |     | NOT NULL | GENERIC TIR CODE VALUES     |            |           |            |               |
| CODE_TYPE  |          | VARCHAR2 | 30    |     | NOT NULL | GENERIC TIR CODE TYPES      |            |           |            |               |
| BLOCK_ID   |          | NUMBER   | 3     |     | NULL     | GENERIC TIR BLOCK ID NUMBER |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TIRSIGN

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                                    | Validation | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|------------|-----------|------------|---------------|
| TEST_PROJ# | TIRTEST  | VARCHAR2 | 20    |     | NOT NULL | TEST PROJECT NUMBER                        |            | TIRTEST   | TEST_PROJ# |               |
| TIRPRFX    | TIRTEST  | VARCHAR2 | 5     |     | NOT NULL | TIR PREFIX                                 |            | TIRTEST   | TIRPRFX    |               |
| DBUSERNAME |          | VARCHAR2 | 20    |     | NOT NULL | DATABASE USER NAME                         |            |           |            |               |
| TITLE_TYPE |          | CHAR     | 1     |     | NOT NULL | USER TITLE TYPE                            |            |           |            |               |
| PHONE      |          | VARCHAR2 | 34    |     | NULL     | PHONE OF PREPARER OR<br>COMMANDER          |            |           |            |               |
| SIGNNAME   |          | VARCHAR2 | 34    |     | NULL     | SIGNATURE/NAME OF PREPARER<br>OR COMMANDER |            |           |            |               |
| TITLE      |          | VARCHAR2 | 34    |     | NULL     | TITLE OF PREPARER OR<br>COMMANDER          |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TIRTEST

| Col Name     | FrnTable | Type     | Width | Dec | Null/Not | Comment                                  | Validation | Ref Table | Ref Column | Column Format |
|--------------|----------|----------|-------|-----|----------|--|------------|-----------|------------|---------------|
| TEST_PROJ#   |          | VARCHAR2 | 20    |     | NOT NULL | Block 3: TIR Project number              |            |           |            |               |
| TIRPRFX      |          | VARCHAR2 | 5     |     | NOT NULL | Block 4: TIR Number First 4-5 Characters |            |           |            |               |
| REMARKS      |          | VARCHAR2 | 2000  |     | NULL     | TIR TEST REMARKS                         |            |           |            |               |
| SYSTEM       |          | VARCHAR2 | 14    |     | NULL     | Block 7: Major Item System Name          |            |           |            |               |
| TEST_AGENCY  |          | VARCHAR2 | 20    |     | NULL     | Block 5: Test Agency Name                |            |           |            |               |
| TEST_SPONSOR |          | VARCHAR2 | 20    |     | NULL     | Block 6: Program Sponsor of TIR          |            |           |            |               |
| TEST_TITLE   |          | VARCHAR2 | 34    |     | NULL     | Block 2: Test Project Title              |            |           |            |               |
| MISC_CODE    |          | VARCHAR2 | 8     |     | NULL     | TIR MESSAGE CODE                         |            |           |            |               |
| RPT_TYP      |          | VARCHAR2 | 1     |     | NULL     | TIR REPORT TYPE                          |            |           |            |               |



## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TIRTEXT

| Col Name   | FmTable | Type     | Width | Dec | Null/Not | Comment   | Validation | Ref Table | Ref Column | Column Format |
|------------|---------|----------|-------|-----|----------|---|------------|-----------|------------|---------------|
| TEST_PROJ# | TIRDATA | VARCHAR2 | 20    |     | NOT NULL | Block 3: Test Project Number                          |            | TIRTEST   | TEST_PROJ# |               |
| TIRPRFX    | TIRDATA | VARCHAR2 | 5     |     | NOT NULL | FIRST FIVE CHARACTER OF TIR#                          |            | TIRTEST   | TIRPRFX    |               |
| TIR#       | TIRDATA | VARCHAR2 | 10    |     | NOT NULL | Block 4: TIR Number                                   |            | TIRLOG    | TIR#       |               |
| TIR_REV    | TIRDATA | VARCHAR2 | 2     |     | NOT NULL | Block 1-2: TIR Revision Number                        |            | TIRLOG    | TIR_REV    |               |
| INC_TITLE  |         | VARCHAR2 | 72    |     | NULL     | Block 90 First Line, Incident Title, same as Block 30 |            |           |            |               |
| TEXT       |         | LONG     |       |     | NULL     | Block 90: Description of the incident                 |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: TIRUSAGE

| Col Name      | FrnTable | Type     | Width | Dec | Null/Not | Comment                  | Validation | Ref Table | Ref Column | Column Format |
|---------------|----------|----------|-------|-----|----------|--------------------------|------------|-----------|------------|---------------|
| TEST_PROJ#    | TIRTEST  | VARCHAR2 | 20    |     | NOT NULL | TEST PROJECT NUMBER      |            | TIRTEST   | TEST_PROJ# |               |
| TIRPREFIX     | TIRTEST  | VARCHAR2 | 5     |     | NOT NULL | TIR PREFIX               |            | TIRTEST   | TIRPRFX    |               |
| TABLE_NAME    |          | VARCHAR2 | 15    |     | NOT NULL | TABLE NAME               |            |           |            |               |
| COLUMN_NAME   |          | VARCHAR2 | 30    |     | NOT NULL | COLUMN NAME              |            |           |            |               |
| BLOCK_ID      |          | NUMBER   | 3     |     | NULL     | TIR BLOCK ID NUMBER      |            |           |            |               |
| CUSTOM_USAGE  |          | VARCHAR2 | 4     |     | NULL     | COLUMN CUSTOM USAGE      |            |           |            |               |
| DEF_VALUE     |          | VARCHAR2 | 20    |     | NULL     | DEFAULT VALUE FOR COLUMN |            |           |            |               |
| FLD_SEQ       |          | NUMBER   |       |     | NULL     | FIELD SEQUENCE           |            |           |            |               |
| GENERIC_USAGE |          | VARCHAR2 | 4     |     | NULL     | GENERIC COLUMN USAGE     |            |           |            |               |
| MAX_VALUE     |          | VARCHAR2 | 20    |     | NULL     | MAXIMUM VALUE            |            |           |            |               |
| MIN_VALUE     |          | VARCHAR2 | 20    |     | NULL     | MINIMUM VALUE            |            |           |            |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: UNIT

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE | TEST     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                                     | test_lookup     | TEST      | TEST_PHASE |               |
| UIC        |          | VARCHAR2 | 6     |     | NOT NULL | UNIT IDENTIFIER CODE                           | alpha_num_check |           |            |               |
| COMPONENT  |          | VARCHAR2 | 3     |     | NULL     | MILITARY COMPONENT I.E. USAR                   | lcf_lookup      | LCFCODES  | CODE       |               |
| DODAAC     |          | VARCHAR2 | 6     |     | NULL     | DEPARTMENT OF DEFENSE<br>ACTIVITY ADDRESS CODE | alpha_num_check |           |            |               |
| SRVC       |          | VARCHAR2 | 4     |     | NULL     | MILITARY SERVICE                               | lcf_lookup      | LCFCODES  | CODE       |               |
| SRVC_BRNCH |          | VARCHAR2 | 2     |     | NULL     | MILITARY SERVICE BRANCH                        | lcf_lookup      | LCFCODES  | CODE       |               |
| UNIT_NAME  |          | VARCHAR2 | 20    |     | NULL     | UNIT NAME                                      |                 |           |            |               |
| UNIT_TYP   |          | VARCHAR2 | 1     |     | NULL     | TYPE OF UNIT                                   | lcf_lookup      | LCFCODES  | CODE       |               |

## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: UNITDETL

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment                              | Validation                | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--------------------------------------|---------------------------|-----------|------------|---------------|
| TEST_PHASE | UNIT     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE                           |                           |           |            |               |
| UIC        | UNIT     | VARCHAR2 | 6     |     | NOT NULL | UNIT IDENTIFIER CODE                 |                           |           |            |               |
| UNIT_LEVEL |          | VARCHAR2 | 1     |     | NOT NULL | LEVEL OF UNIT                        | lcf_lookup                | LCFCODES  | CODE       |               |
| UNIT_BEG   |          | DATE     | 9     |     | NOT NULL | BEGIN DATE AND TIME AT THIS LOCATION |                           |           |            | YYDDDDHH24MI  |
| LOC        |          | VARCHAR2 | 4     |     | NULL     | LOCATION OF UNIT                     |                           |           |            |               |
| UNIT_END   |          | DATE     | 9     |     | NULL     | END DATE AND TIME AT THIS LOCATION   | lcf_lookup<br>in_the_past | LCFCODES  | CODE       | YYDDDDHH24MI  |

## UnIRAM Data Dictionary

Report Date: 27-MAR-03  
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Table Name: WHERE\_PHRASE

| Col Name | FrnTable | Type     | Width | Dec | Null/Not | Comment              | Validation | Ref Table | Ref Column | Column Format |
|----------|----------|----------|-------|-----|----------|----------------------|------------|-----------|------------|---------------|
| SEQ_NO   |          | NUMBER   | 5     | 1   | NOT NULL | SEQUENCE NUMBER      |            |           |            |               |
| TEXT     |          | VARCHAR2 | 2000  |     | NULL     | SAMPLE WHERE PHRASES |            |           |            | 990.9         |

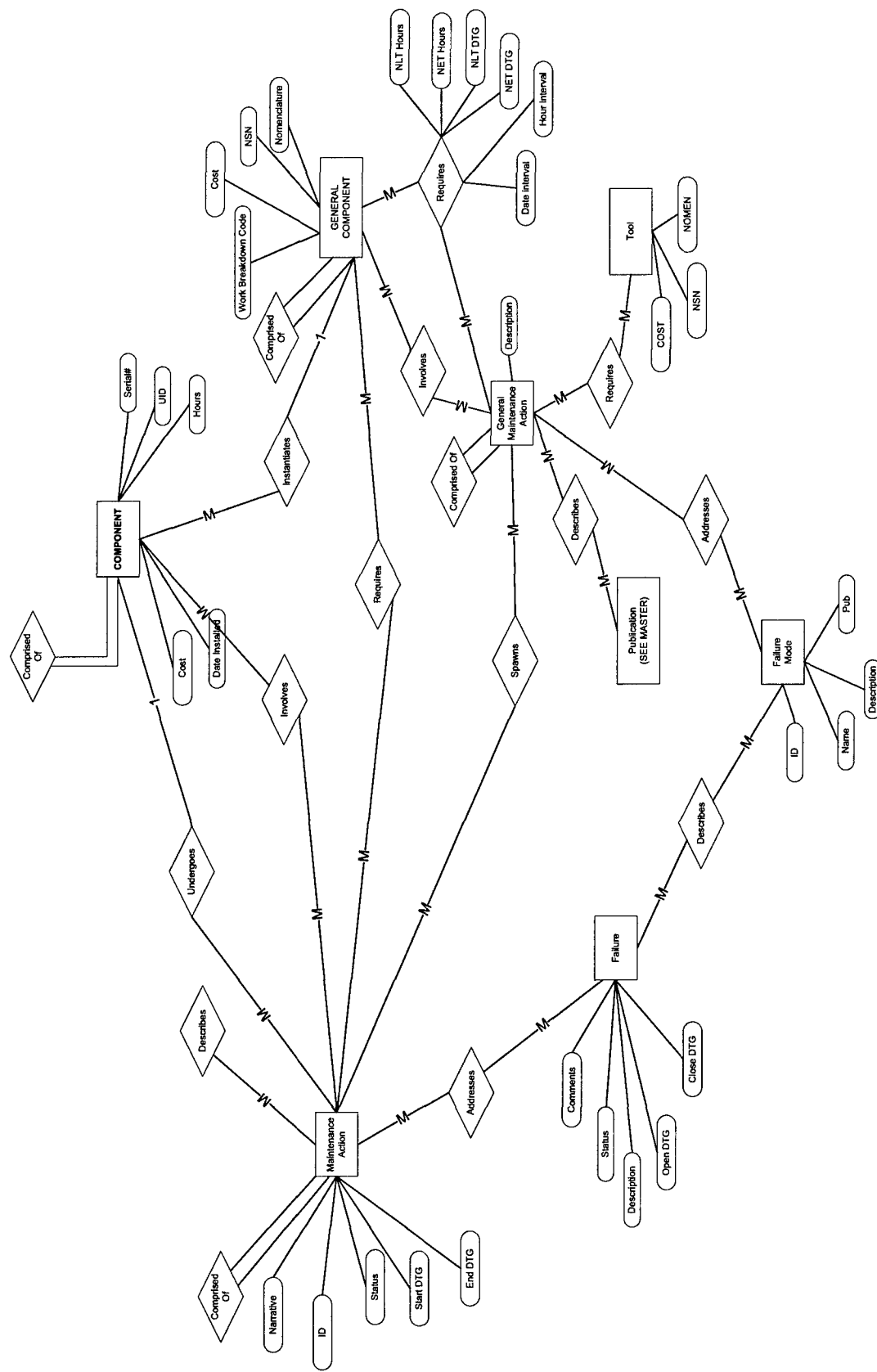
## UniRAM Data Dictionary

Report Date: 27-MAR-03  
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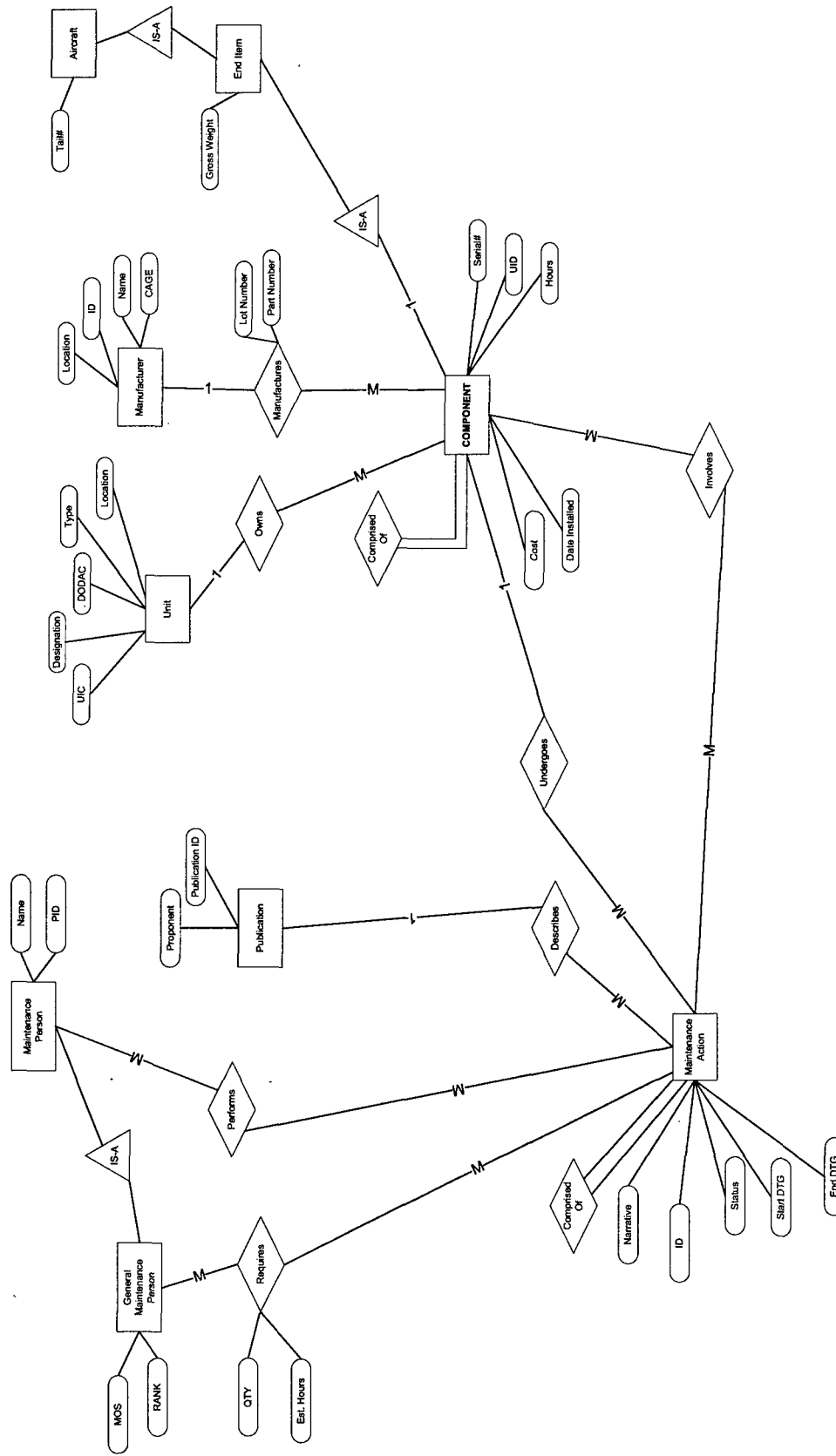
Table Name: WORKUNIT

| Col Name   | FrnTable | Type     | Width | Dec | Null/Not | Comment  | Validation      | Ref Table | Ref Column | Column Format |
|------------|----------|----------|-------|-----|----------|--|-----------------|-----------|------------|---------------|
| TEST_PHASE | TEST     | VARCHAR2 | 6     |     | NOT NULL | TEST PHASE   | test_lookup     | TEST      | TEST_PHASE |               |
| EI_MODEL   |          | VARCHAR2 | 6     |     | NOT NULL | END ITEM MODEL I.E. AH64A,<br>T800                     | lcf_lookup      | LCFCODES  | CODE       |               |
| WUC        |          | VARCHAR2 | 15    |     | NOT NULL | WORK UNIT CODE OF THE PART                             | alpha_num_check |           |            |               |
| LSA_NUM    |          | VARCHAR2 | 27    |     | NULL     | LOGISTICS SUPPORT ANALYSIS<br>NUMBER                   |                 |           |            |               |
| NOMEN      |          | VARCHAR2 | 30    |     | NULL     | NOMENCLATURE OF THE WORK<br>UNIT CODE                  |                 |           |            |               |
| WUC_Is_MDC |          | VARCHAR2 | 1     |     | NULL     | WORK UNIT CODE IS VALID FOR<br>MAJOR DYNAMIC COMPONENT | check const     |           |            |               |

## Appendix G – CBMUDM Entity Relationship Diagram



# Appendix G – CBMUDM Entity Relationship Diagram





The diagram illustrates the relationships between various entities in a defense system. The entities and their attributes are as follows:

- Flight Regime**: ID, Name, Description
- Aircraft**: Tail#
- End Item**: Gross Weight
- Manufacturer**: Location, ID, Name, CAGE
- Unit**: Designation, UIC, DODAC, Location, Type
- Component**: Serial#, UID, Hours, Cost, Date Installed
- State Descriptor**: Units, Frequency, Description, ID
- Usage Period**: Start DTG, End DTG
- Describes**: Upper Limit, Lower Limit, Duration, Order

The relationships and their cardinalities are:

- Produces** (Flight Regime to State Descriptor): 1 to M
- Creates** (End Item to Usage Period): 1 to M
- Manufactures** (Manufacturer to Component): 1 to M
- Owns** (Unit to Component): 1 to M
- Comprised Of** (Component to Usage Period): 1 to M

Additional relationships and attributes include:

- Produces** (End Item to Usage Period): 1 to M
- Produces** (Usage Period to State Descriptor): 1 to M
- Produces** (Usage Period to Describes): 1 to M

The diagram is an Entity-Relationship (ER) model for a maintenance system. It features several entities and their relationships:

- COMPONENT**: Attributes include Serial, UID, Hours, Cost, Date Installed, and a 'Comprised Of' relationship to itself. It is linked to **GENERAL COMPONENT** via an 'Instantiates' relationship.
- GENERAL COMPONENT**: Attributes include Work Breakdown Code, NSN, Nomencature, and Cost. It is linked to **State Descriptor** via a 'Describes' relationship and to **General Maintenance Action** via an 'Involves' relationship.
- State Descriptor**: Attributes include ID, Type, Description, Units, Frequency, and Description. It is linked to **Sensor** via a 'Produces' relationship.
- Sensor**: Attributes include ID, Type, and Description.
- General Maintenance Action**: Attributes include Description, Date Interval, Hour Interval, NLT DTG, NET DTG, NLT Hours, and NET Hours. It is linked to **Tool** via a 'Requires' relationship and to **Failure Mode** via an 'Addresses' relationship.
- Tool**: Attributes include NSN, NOMEN, and COST. It is linked to **General Maintenance Action** via a 'Requires' relationship.
- Failure Mode (SEE MASTER)**: Attributes include ID, Name, Pub, and Description. It is linked to **General Maintenance Action** via an 'Addresses' relationship.
- Relationships**:
  - Instantiates**: Connects **COMPONENT** to **GENERAL COMPONENT**.
  - Describes**: Connects **GENERAL COMPONENT** to **State Descriptor**.
  - Produces**: Connects **State Descriptor** to **Sensor**.
  - Involves**: Connects **GENERAL COMPONENT** to **General Maintenance Action**.
  - Requires**: Connects **General Maintenance Action** to **Tool**.
  - Addresses**: Connects **General Maintenance Action** to **Failure Mode**.

## Appendix H – MDR and VMEP Low-Level Stage Physical Design

```

/*****
*   MDR LOW LEVEL SCHEMA
*
*   Created      3/9/2005
*   Modified     4/7/2005
*   Project      CBM
*   Model        Low level table create script
*   Author       Henderson
*   Editor       Henderson Last Update: 7 APR 2005
*   Database     Oracle 10g - MDR Schema
*****/
--drop user MDR cascade;

Drop table "MDR"."MDR_PARAM";

Drop table "MDR"."MDR_DATA";

Drop table "MDR"."MDR_MISSION";

Drop public synonym "MDR_DATA";

Drop public synonym "MDR_PARAM";

Drop public synonym "MDR_MISSION";

Drop sequence "MDR"."NEXT_MISSION_ID";

--create user mdr
create user mdr identified by w35tar
default tablespace mdrdata temporary tablespace temp;

grant connect, dba to mdr;

-- Create Types section

-- Create Tables section
--MDR PARAMETER TABLE
CREATE TABLE "MDR"."MDR_PARAM" (
  "PARAMETER_ID" NUMBER ,
  "DESCRIPTION" VARCHAR2(40) ,
  "BITSIZE" NUMBER ,
  "MIN_VAL" NUMBER(12,4) ,
  "FULL_SCALE" NUMBER(12,4) ,
  "UNITS" VARCHAR2(60) ,
  "RESOLUTION" NUMBER(14,12) ,
  "ENUM" VARCHAR2(5) ,
  "CBMUDM_STATE_DESCRIPTOR_ID" NUMBER(8),
  CONSTRAINT "MDR_PARAM$PK" PRIMARY KEY ("PARAMETER_ID") VALIDATE )
  ORGANIZATION INDEX TABLESPACE "MDRDATA";

ALTER TABLE MDR.MDR_PARAM ADD (
  CONSTRAINT MDR_PARAM$PARAMETER_ID$NN CHECK ("PARAMETER_ID" IS NOT NULL));

```

## Appendix H – MDR and VMEP Low-Level Stage Physical Design

```
CREATE INDEX "MDR"."MDR_PARAMS$DESCRIPTION$IDX" ON "MDR"."MDR_PARAM" ("DESCRIPTION")
TABLESPACE "MDRINDX" COMPUTE STATISTICS ;

Create public synonym "MDR_PARAM" for "MDR"."MDR_PARAM";

--MDR DATA TABLE
Create table "MDR"."MDR_DATA" (
    PARAMETER_TIME Timestamp ,
    PARAMETER_ID Number ,
    VALUE Number(20,10) ,
    MISSION_ID Number(12),
    CONSTRAINT "MDR_DATA$PK" PRIMARY KEY ("PARAMETER_TIME","PARAMETER_ID","MISSION_ID") VALIDATE )
ORGANIZATION INDEX TABLESPACE "MDRDATA";

ALTER TABLE MDR.MDR_DATA ADD (
    CONSTRAINT MDR_DATA$PARAMETER_TIME$NN CHECK ("PARAMETER_TIME" IS NOT NULL));

ALTER TABLE MDR.MDR_DATA ADD (
    CONSTRAINT MDR_DATA$PARAMETER_ID$NN CHECK ("PARAMETER_ID" IS NOT NULL));

ALTER TABLE MDR.MDR_DATA ADD (
    CONSTRAINT MDR_DATA$EI_MODEL$NN CHECK ("MISSION_ID" IS NOT NULL));

Create public synonym "MDR_DATA" for "MDR"."MDR_DATA";

--MDR MISSION TABLE
CREATE TABLE "MDR"."MDR_MISSION" (
    "MISSION_ID" NUMBER ,
    "START_DTG" TIMESTAMP ,
    "END_DTG" TIMESTAMP ,
    "EI_SN" VARCHAR2(12) ,
    "EI_MODEL" VARCHAR2(12) ,
    "FILE_NAME" VARCHAR2(255),
    "STATUS" Number,
    CONSTRAINT "MDR_MISSION$PK" PRIMARY KEY ("MISSION_ID") VALIDATE )
ORGANIZATION INDEX TABLESPACE "MDRDATA";

ORGANIZATION INDEX TABLESPACE "MDRDATA";

ALTER TABLE MDR.MDR_MISSION ADD (
    CONSTRAINT MDR_MISSION$MISSION_ID$NN CHECK ("MISSION_ID" IS NOT NULL));

ALTER TABLE MDR.MDR_MISSION ADD (
    CONSTRAINT MDR_MISSION$START_DTG$NN CHECK ("START_DTG" IS NOT NULL));

ALTER TABLE MDR.MDR_MISSION ADD (
    CONSTRAINT MDR_MISSION$END_DTG$NN CHECK ("END_DTG" IS NOT NULL));

Create public synonym "MDR_MISSION" for "MDR"."MDR_MISSION";
```

## Appendix H – MDR and VMEP Low-Level Stage Physical Design

```
--Create Sequence for MDR Mission ID
CREATE SEQUENCE "MDR"."NEXT_MISSION_ID" NOCYCLE NOORDER CACHE 20 NOMAXVALUE MINVALUE 1 INCREMENT
BY 1 START WITH 1;

-- Create Table comments section

Comment on table "MDR_PARAM" is 'The MDR_PARAM table is a list of all possible MDR parameters and
their respective characteristics.'

Comment on table "MDR_DATA" is 'The MDR_DATA table is used to store actual MDR parameter values
from flights.';

Comment on table "MDR_MISSION" is 'The MDR_MISSION table is used to store information about the
aircraft and start & end of missions. Missions correspond to individual MDR files from
LINSYGAS.';

-- Create Attribute comments section

Comment on column "MDR_PARAM"."PARAMETER_ID" is 'A unique integer identifier for each MDR
parameter.' ;

Comment on column "MDR_PARAM"."DESCRIPTION" is 'A text description of the MDR parameter.' ;

Comment on column "MDR_PARAM"."BITSIZE" is 'The size of the MDR parameter data, in bits.' ;

Comment on column "MDR_PARAM"."MIN_VAL" is 'The minimum value of the MDR parameter.' ;

Comment on column "MDR_PARAM"."FULL_SCALE" is 'The upper limit of the MDR parameter.';

Comment on column "MDR_PARAM"."UNITS" is 'The units (meters, seconds, etc) corresponding to the
MDR parameter.';

Comment on column "MDR_PARAM"."RESOLUTION" is 'The resolution (?) of the MDR parameter.';

Comment on column "MDR_DATA"."PARAMETER_TIME" is 'The date time group (DTG) corresponding to the
MDR measurement, Measured in GMT time.';

Comment on column "MDR_DATA"."VALUE" is 'The recorded value for the MDR parameter during the said
time.' ;

Comment on column "MDR_DATA"."PARAMETER_ID" is 'Foreign key linking the MDR measurement to the
associate MDR parameter.';

Comment on column "MDR_DATA"."MISSION_ID" is 'Foreign key linking the MDR measurement to the
associate MDR MISSION (aircraft info).';

Comment on column "MDR_MISSION"."MISSION_ID" is 'The mission number when MDR_DATA was recorded.';

Comment on column "MDR_MISSION"."START_DTG" is 'The start date time group of the mission. First
entry in data file.';

Comment on column "MDR_MISSION"."END_DTG" is 'The end date time group of the mission. First
entry in data file.';

Comment on column "MDR_MISSION"."EI_MODEL" is 'The model of the aircraft producing MDR
measurements.';

Comment on column "MDR_MISSION"."EI_SN" is 'The serial number of the aircraft producing MDR
measurements.';

Comment on column "MDR_MISSION"."FILE_NAME" is 'The file name of the source data file for the
mission.';

Comment on column "MDR_MISSION"."STATUS" is 'The status of the source file. 0=non processed,
1=processed with success, 2=processed with errors (bad data), 3=unprocessed unreadable file,
4=mark for reload';
```

## Appendix H -- MDR and VMEP Low-Level Stage Physical Design

```

/*****
*   VMEP LOW LEVEL SCHEMA
*
*   Reference:   IAC ExportToText ICD
*
*   Created      3;11;2005
*   Modified     4;9;2005
*   Project      CBM
*   Model        Low level table create script
*   Author       Henderson
*   Database     Oracle 10g - VMEP Schema
*****/
spool /home/oracle/sql/buildvmep.txt;

Drop table "VMEP"."VMEP_DATA";

Drop table "VMEP"."VMEP_MISSION";

Drop table "VMEP"."VMEP_PARAM";

--create user vmep
create user vmep identified by w35tar
default tablespace vmep temporary tablespace temp;

-- Create Tables section

Create table "VMEP"."VMEP_DATA" (
    "VMEP_SEQ" Number NOT NULL,
    "CI_ID" Varchar2(255) NOT NULL ,
    "CI_TIME" Timestamp NOT NULL,
    "CI_VECTOR" Number(9,6) NOT NULL,
    "MISSION_ID" Number NOT NULL,
    CONSTRAINT "VMEP_DATA$VMEP_SEQ$PK" PRIMARY KEY ("VMEP_SEQ")
)
TABLESPACE "VMEPDATA";

DROP PUBLIC SYNONYM "VMEP_DATA";

CREATE PUBLIC SYNONYM "VMEP_DATA" for "VMEP"."VMEP_DATA";

CREATE table "VMEP"."VMEP_MISSION" (
    "MISSION_ID" NUMBER,
    "VMEP_MODE" VARCHAR2(20),
    "AIRCRAFT_TYPE" VARCHAR2(20),
    "AIRCRAFT_SERIAL" VARCHAR2(20),
    "START_DTG" Timestamp,
    "END_DTG" Timestamp,
    "VMEP_STATE" VARCHAR2(10),
    "STATUS" NUMBER,
    "HOUSING_DIR_NAME" VARCHAR2(255),
    CONSTRAINT "VMEP_MISSION$MISSION_ID$PK" PRIMARY KEY ("MISSION_ID")
)
TABLESPACE "VMEPDATA";

DROP PUBLIC SYNONYM "VMEP_MISSION";

CREATE PUBLIC SYNONYM "VMEP_MISSION" for "VMEP"."VMEP_MISSION";

DROP SEQUENCE "VMEP"."NEXT_MISSION_ID";

CREATE SEQUENCE "VMEP"."NEXT_MISSION_ID" NOCYCLE NOORDER CACHE 20 NOMAXVALUE MINVALUE 1 INCREMENT
BY 1 START WITH 1 ;

DROP SEQUENCE "VMEP"."NEXT_VMEP_SEQ";

CREATE SEQUENCE "VMEP"."NEXT_VMEP_SEQ" NOCYCLE NOORDER CACHE 20 NOMAXVALUE MINVALUE 1 INCREMENT
BY 1 START WITH 1 ;

CREATE table "VMEP"."VMEP_PARAM" (
    "CI_ID" Varchar2(255) NOT NULL ,

```

## Appendix H – MDR and VMEP Low-Level Stage Physical Design

```
"DESCRIPTION" Varchar2(255),
"MIN_VALUE"    Number,
"MAX_VALUE"    Number,
"UNITS"        Varchar2(25) ,
"CBMUDM_STATE_DESCRIPTOR_ID" NUMBER(8),
CONSTRAINT "VMEP_PARAM$CI_ID$PK" PRIMARY KEY ("CI_ID")
)
TABLESPACE "VMEPDATA";

DROP PUBLIC SYNONYM "VMEP_PARAM";

CREATE PUBLIC SYNONYM "VMEP_PARAM" for "VMEP"."VMEP_PARAM";

-- Create Table comments section

Comment on table "VMEP_DATA" is 'The VMEP_DATA table is used to store actual VMEP parameter
values during flight.';

Comment on table "VMEP_MISSION" is 'The VMEP_MISSION table is used to store information about a
particular VMEP recording. A VMEP recording has many VMEP_DATA entries';

Comment on table "VMEP_PARAM" is 'The VMEP_PARAM table is used to store information about a the
VMEP CI Parameters (desription ranges, etc)';

-- Create Attribute comments section

Comment on column "VMEP_DATA"."CI_ID" is 'A unique integer identifier for the CI sensor.';

Comment on column "VMEP_DATA"."CI_TIME" is 'The DTG the CI was recorded - YYMMDD_HHMMSS';

Comment on column "VMEP_DATA"."CI_VECTOR" is 'The value of the CI.';

Comment on column "VMEP_DATA"."MISSION_ID" is 'The foreign key of the corresponding vmep mission
(set of measurements)';

Comment on column "VMEP_MISSION"."MISSION_ID" is 'A unique integer for the VMEP recording or
mission.';

Comment on column "VMEP_MISSION"."VMEP_MODE" is 'The mode the VDU was in when the measurements
was made.';

Comment on column "VMEP_MISSION"."AIRCRAFT_TYPE" is 'The type of aircraft making the
measurement.';

Comment on column "VMEP_MISSION"."AIRCRAFT_SERIAL" is 'The serial number of aircraft making the
measurement.';

Comment on column "VMEP_MISSION"."START_DTG" is 'The start date time group of the VMEP mission.';

Comment on column "VMEP_MISSION"."END_DTG" is 'The end date time group of the VMEP mission.';

Comment on column "VMEP_MISSION"."VMEP_STATE" is 'The state of the VMEP system when parameters
where recorded (MONITOR, BIT, etc)';

Comment on column "VMEP_MISSION"."STATUS" is 'The status of the source file. 0=non processed,
1=processed with success, 2=processed with errors (bad data), 3=unprocessed unreadable file,
4=mark for reload';

Comment on column "VMEP_MISSION"."HOUSING_DIR_NAME" is 'the source directory housing the
All_CI.txt (source) file.';

Comment on column "VMEP_PARAM"."CI_ID" is 'A unique integer identifier for the CI sensor.';

Comment on column "VMEP_PARAM"."DESCRIPTION" is 'A description of the CI.';

Comment on column "VMEP_PARAM"."MIN_VALUE" is 'The minimum acceptable value for the CI.';

Comment on column "VMEP_PARAM"."MAX_VALUE" is 'The maximum acceptable value for the CI.';

Comment on column "VMEP_PARAM"."UNITS" is 'The units that the CI is measured in.';
```

## **Appendix H – MDR and VMEP Low-Level Stage Physical Design**

Comment on column "VMEP\_PARAM"."CBMUDM\_STATE\_DESCRIPTOR\_ID" is 'Foriegn key linking the VMEP CI to the state descriptor table in the CBMUDM.';



## Entity report

| Entity name                                   | Entity type | Primary key  | # attributes |
|---|-------------|--|--------------|
| AIRCRAFT                                      | independent | AIRCRAFT_ID  | 7            |
| COMPONENT                                     | independent | COMPONENT_ID   | 7            |
| COMPONENT_INSTALLATION_RECORD                 | independent | COMPONENT_ID, SUPER_PART_ID  | 4            |
| END_ITEM                                      | independent | END_ITEM_ID  | 3            |
| FAILURE                                       | dependent   | FAILURE_ID, COMPONENT_ID   | 10           |
| FAILURE_MODE                                  | independent | FAILURE_MODE_ID  | 11           |
| FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION    | dependent   | GENERAL_MAINTENANCE_ACTION_ID, FAILURE_MODE_ID   | 2            |
| GEN_COMP__REQ_GEN_MAINT                       | dependent   | COMPONENT_ID, GENERAL_MAINTENANCE_ACTION_ID  | 5            |
| GEN_COMPONENT_REQ_GEN_MAINT                   | dependent   | GENERAL_COMPONENT_ID, GENERAL_MAINTENANCE_ACTION_ID  | 5            |
| GEN_COMPONENT_STATE_DESCRIPTOR                | dependent   | GENERAL_COMPONENT_ID, STATE_DESCRIPTOR_ID  | 2            |
| GEN_MAINT_ACTION_REQ_GEN_PERSON               | dependent   | MAINTENANCE_ACTION_ID, MAINTENANCE_PERSON_ID, GENERAL_MAINTENANCE_ACTION_ID, GEN_MAINTENANCE_PERSON_ID | 7            |
| GEN_MAINT_REQ_PUBLICATION                     | dependent   | GENERAL_MAINTENANCE_ACTION_ID, PUBLICATION_ID  | 2            |
| GEN_MAINT_REQ_TOOL                            | dependent   | TOOL_ID, GENERAL_MAINTENANCE_ACTION_ID   | 3            |
| GENERAL_COMPONENT                             | independent | GENERAL_COMPONENT_ID   | 35           |
| GENERAL_MAINTENANCE_ACTION                    | independent | GENERAL_MAINTENANCE_ACTION_ID  | 7            |
| GENERAL_MAINTENANCE_PERSON                    | independent | GEN_MAINTENANCE_PERSON_ID  | 7            |
| MAINT_ACTION_INVOLVES_COMP                    | dependent   | MAINTENANCE_ACTION_ID, COMPONENT_ID  | 2            |
| MAINT_ACTION_INVOLVES_PERSON                  | dependent   | MAINTENANCE_PERSON_ID, MAINTENANCE_ACTION_ID, GEN_MAINTENANCE_PERSON_ID                                | 6            |
| MAINT_ACTION_REQ_GEN_COMPONENT                | dependent   | GENERAL_MAINTENANCE_ACTION_ID, GENERAL_COMPONENT_ID  | 3            |
| MAINTENANCE_ACTION                            | independent | MAINTENANCE_ACTION_ID  | 12           |
| MAINTENANCE_ACTION_ADDRESSES_FAILURE          | dependent   | FAILURE_ID, MAINTENANCE_ACTION_ID, COMPONENT_ID  | 3            |
| MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | dependent   | MAINTENANCE_ACTION_ID, GENERAL_COMPONENT_ID  | 4            |
| MAINTENANCE_PERSON                            | dependent   | MAINTENANCE_PERSON_ID, GEN_MAINTENANCE_PERSON_ID   | 5            |
| MANUFACTURER                                  | independent | CAGE   | 5            |
| PUBLICATION                                   | independent | PUBLICATION_ID   | 3            |
| REGIME  | independent | REGIME_ID  | 4            |
| STATE_DESCRIPTOR                              | independent | STATE_DESCRIPTOR_ID  | 7            |
| TOOL  | independent | TOOL_ID  | 4            |
| UNIT  | independent | UIC  | 13           |
| USAGE_PERIOD                                  | independent | USAGE_PERIOD_ID  | 4            |
| USAGE_PERIOD_REGIME                           | dependent   | REGIME_ID, USAGE_PERIOD_ID   | 5            |

|                                   |           |   |   |
|-----------------------------------|-----------|---|---|
| USAGE_PERIOD_STATE_<br>DESCRIPTOR | dependent | USAGE_PERIOD_ID,<br>STATE_DESCRIPTOR_ID | 5 |
|-----------------------------------|-----------|---|---|

## Entity 'AIRCRAFT'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | AIRCRAFT    |
| <b>Entity type</b> | independent |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name  | Data type | Not null | Unique | Description   |
|-----|----------------------|-----------|----------|--------|---|
| PK  | AIRCRAFT_ID          | Varchar2  | YES      | NO     | A unique identifier (CBMUDM specific) for each aircraft.                |
| FK  | END_ITEM_ID          | Number    | YES      | NO     | Foreign key link to the corresponding END_ITEM entity for the AIRCRAFT. |
|     | AIRCRAFT_TAIL_NUMBER | Varchar2  | NO       | NO     | Tail number (Last 3) of aircraft.                                       |
|     | STATUS_AIRCRAFT      | Varchar2  | NO       | NO     | The DA738-751 status of the aircraft.                                   |
|     | STATUS_ELECTRICAL    | Varchar2  | NO       | NO     | The DA738-751 status of the aircraft's electrical system.               |
|     | STATUS_ARMAMENT      | Varchar2  | NO       | NO     | The DA738-751 status of the aircraft's armament system.                 |
|     | CURRENT_HOURS        | Number    | NO       | NO     | The cumulative number of hours flown by the aircraft.                   |

## Relationships

| Relationship name | Type            | Parent entity | Child entity | Card. |
|-------------------|-----------------|---------------|--------------|-------|
| Relationship115   | Non-identifying | END_ITEM      | AIRCRAFT     | 1:N   |

## Description

AIRCRAFT - An aircraft is a specific type of END\_ITEM.

## Entity 'COMPONENT'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | COMPONENT   |
| <b>Entity type</b> | independent |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name                       | Data type   | Not null | Unique | Description  |
|-----|---|-------------|----------|--------|--|
| PK  | COMPONENT_ID                              | Number      | YES      | NO     | Unique (CBM_UDM specific) identifier for COMPONENT entities                        |
| FK  | GENERAL_COMPONENT_ID/GENERAL_COMPONENT_ID | Integer     | NO       | NO     | Foreign key link to corresponding GENERAL_COMPONENT                                |
|     | SERIAL_NUMBER                             | Varchar2    | NO       | NO     | The serial number of the part. Used to uniquely identify the component from peers. |
|     | LOT_NUMBER                                | Varchar2    | NO       | NO     | Lot Number   |
|     | OWNING_UIC                                | Varchar2    | NO       | NO     | Foreign key link to the UNIT that "owns" or controls the part.                     |
| FK  | UIC                                       | Varchar2    | NO       | NO     |  |
|     | WEIGHT                                    | Number(x,y) | NO       | NO     | Weight of the component in pounds.   |

## Relationships

| Relationship name                       | Type            | Parent entity                                 | Child entity                  | Card. |
|---|-----------------|---|-------------------------------|-------|
| COMPONENTCOMPONENT_INSTALLATION_RECORD  | Informative     | COMPONENT                                     | COMPONENT_INSTALLATION_RECORD | 1:N   |
| COMPONENTCOMPONENT_INSTALLATION_RECORD1 | Informative     | COMPONENT                                     | COMPONENT_INSTALLATION_RECORD | 1:N   |
| Relationship65                          | Non-identifying | COMPONENT                                     | END_ITEM                      | 1:1   |
| Relationship66                          | Identifying     | COMPONENT                                     | MAINT_ACTION_INVOLVES_COMP    | 1:N   |
| ABSTRACT_COMPONENTCOMPONENT             | Non-identifying | GENERAL_COMPONENT                             | COMPONENT                     | 1:N   |
| Relationship67                          | Informative     | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | COMPONENT                     | 1:N   |
| Relationship64                          | Non-identifying | UNIT  | COMPONENT                     | 1:N   |
| Relationship84                          | Identifying     | COMPONENT                                     | FAILURE                       | 1:N   |
| Relationship90                          | Identifying     | COMPONENT                                     | GEN_COMP_REQ_GEN_MAINT        | 1:N   |

## Description

The central entity of the CBMUDM. A physical component, part, assembly, or aircraft that is installed on or existing in reality. Not to be confused with a GENERAL\_COMONENT. Example - Apache 87-0446 is a physical AH-64A

## Entity 'COMPONENT\_INSTALLATION\_RECORD'

|                    |                               |
|--------------------|-------------------------------|
| <b>Entity name</b> | COMPONENT_INSTALLATION_RECORD |
| <b>Entity type</b> | independent                   |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name      | Data type | Not null | Unique | Description   |
|-----|--------------------------|-----------|----------|--------|---|
| PK  | COMPONENT_ID/SUB_PART_ID | Number    | YES      | NO     | Foreign key of sub-component  |
| PK  | SUPER_PART_ID            | Number    | YES      | NO     | Foreign key of super-component  |
|     | DATE_INSTALLED_DT        | Timestamp | NO       | NO     | Date component defined by SUB_COMPONENT_ID was installed on component defined by SUPER_COMPONENT_ID. NULL for removal actions       |
|     | DATE_REMOVED_DT          | Timestamp | NO       | NO     | Date component defined by SUB_COMPONENT_ID was removed from component defined by SUPER_COMPONENT_ID. NULL for installation actions. |

## Relationships

| Relationship name                       | Type        | Parent entity | Child entity                  | Card. |
|---|-------------|---------------|-------------------------------|-------|
| COMPONENTCOMPONENT_INSTALLATION_RECORD  | Informative | COMPONENT     | COMPONENT_INSTALLATION_RECORD | 1:N   |
| COMPONENTCOMPONENT_INSTALLATION_RECORD1 | Informative | COMPONENT     | COMPONENT_INSTALLATION_RECORD | 1:N   |

## Description

This entity is used to track what components were replaced by other components, and when.

## Entity 'END\_ITEM'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | END_ITEM    |
| <b>Entity type</b> | independent |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description   |
|-----|---------------------|-----------|----------|--------|---|
| PK  | END_ITEM_ID         | Number    | YES      | NO     | Unique identifier (CDM_UDM specific) for END_ITEM entities  |
| FK  | COMPONENT_ID        | Number    | YES      | NO     | Foreign key link to COMPONENT that is the generalization of the END_ITEM. For example, a TRUCK is a special kind of COMPONENT (made up of other components) that is tracked as an END_ITEM. |
|     | STATUS              | Varchar2  | NO       | NO     | The operational status of the end item.   |

## Relationships

| Relationship name | Type            | Parent entity | Child entity | Card. |
|-------------------|-----------------|---------------|--------------|-------|
| Relationship73    | Non-identifying | END_ITEM      | USAGE_PERIOD | 1:N   |
| Relationship65    | Non-identifying | COMPONENT     | END_ITEM     | 1:1   |
| Relationship115   | Non-identifying | END_ITEM      | AIRCRAFT     | 1:N   |

## Description

END\_ITEM - An end item is the top level component in the part/component hierarchy. It is tracked separately to allow for capturing of attributes that are common to the end item.

## Entity 'FAILURE'

|                    |           |
|--------------------|-----------|
| <b>Entity name</b> | FAILURE   |
| <b>Entity type</b> | dependent |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name     | Data type | Not null | Unique | Description  |
|-----|-------------------------|-----------|----------|--------|--|
| PK  | FAILURE_ID              | Integer   | YES      | NO     | A unique identifier (CBM_UDM Specific) for the failure entity              |
|     | HOW_RECOGNIZED_CODE     | Varchar2  | NO       | NO     | DA PAM 738-751 Code for how the failure or degradation was recognized      |
|     | WHEN_DISCOVERED_CODE    | Varchar2  | NO       | NO     | DA PAM 738-751 Code for when the failure or degradation was recognized     |
|     | MALFUNCTION_EFFECT_CODE | Varchar2  | NO       | NO     | DA PAM 738-751 Code detailing the effect of the malfunction                |
|     | STATE_DESCRIPTOR_ID     | Integer   | NO       | NO     | Foreign key of the STATE_DESCRIPTOR describing the failure (if applicable) |
|     | STATE_DESCRIPTOR_VALUE  | Integer   | NO       | NO     | Value of the STATE_DESCRIPTOR (id applicable)                              |
|     | REMARKS                 | Long      | NO       | NO     | Remarks describing the failure   |
|     | STATUS                  | Varchar2  | NO       | NO     | DA PAM 738-751 Status Code of Failure (X, Circle-X, Diagonal)              |
| FK  | FAILURE_MODE_ID         | Integer   | NO       | NO     | Foreign key to the describing FAILURE_MODE (if applicable)                 |
| PFK | COMPONENT_ID            | Number    | YES      | NO     |  |

## Relationships

| Relationship name | Type            | Parent entity | Child entity                         | Card. |
|-------------------|-----------------|---------------|--------------------------------------|-------|
| Relationship23    | Identifying     | FAILURE       | MAINTENANCE_ACTION_ADDRESSES_FAILURE | 1:N   |
| Relationship71    | Non-identifying | FAILURE_MODE  | FAILURE                              | 1:N   |
| Relationship84    | Identifying     | COMPONENT     | FAILURE                              | 1:N   |

## Entity 'FAILURE\_MODE'

|                    |              |
|--------------------|--------------|
| <b>Entity name</b> | FAILURE_MODE |
| <b>Entity type</b> | independent  |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name              | Data type        | Not null | Unique | Description   |
|-----|----------------------------------|------------------|----------|--------|---|
| PK  | FAILURE_MODE_ID                  | Integer          | YES      | NO     | Unique (CBM_UDM) identifier for the FAILURE_MODE entity                         |
| FK  | GENERAL_COMPONENT_ID             | Integer          | YES      | NO     |   |
|     | FAILURE_MODE_DESCRIPTION         | Varchar2         | NO       | NO     | Description of the failure mode   |
|     | FAILURE_MODE_PUBLICATION_ID      | Long             | NO       | NO     | Foreign key of PUBLICATION describing or prescribing the FAILURE_MODE           |
|     | FAILURE_MODE_PUBLICATION_SECTION | Varchar2         | NO       | NO     | Section and page information for the PUBLICATION describing the failure mode.   |
|     | FAILURE_MODE_TITLE               | Varchar2         | NO       | NO     | A short description of the failure mode. Example - "Hydraulic Pump Overheating" |
|     | FAILURE_CODE                     | Varchar2         | NO       | NO     | DA PAM 738-751 Failure Code   |
|     | STATE_DESCRIPTOR_ID              | Integer          | NO       | NO     | Foreign key of describing STATE_DESCRIPTOR (if applicable)                      |
|     | STATE_DESCRIPTOR_MIN_VALUE       | Double precision | NO       | NO     | Minimum acceptable value of STATE_DESCRIPTOR (if applicable)                    |
|     | STATE_DESCRIPTOR_MAX_VALUE       | Double precision | NO       | NO     | Maximum acceptable value of STATE_DESCRIPTOR (if applicable)                    |
|     | STATE_DESCRIPTOR_DURATION        | Double precision | NO       | NO     | Duration (in seconds) of exceedance of STATE_DESCRIPTOR (if applicable)         |

## Relationships

| Relationship name | Type            | Parent entity     | Child entity                               | Card. |
|-------------------|-----------------|-------------------|--|-------|
| Relationship70    | Identifying     | FAILURE_MODE      | FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION | 1:N   |
| Relationship71    | Non-identifying | FAILURE_MODE      | FAILURE                                    | 1:N   |
| Relationship78    | Non-identifying | GENERAL_COMPONENT | FAILURE_MODE                               | 1:N   |

## Description

A failure mode describes a condition when a component is considered "failed" or degraded. For example, if a hydraulic hose springs a leak, then the hose is experiencing a failure mode known as "leaking."



## Entity 'FAILURE\_MODE\_REQUIRES\_GENERAL\_MAINT\_ACTION'

|                    |  |
|--------------------|--|
| <b>Entity name</b> | FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION |
| <b>Entity type</b> | dependent                                  |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name           | Data type | Not null | Unique | Description |
|-----|-------------------------------|-----------|----------|--------|-------------|
| PFK | GENERAL_MAINTENANCE_ACTION_ID | Integer   | YES      | NO     |             |
| PFK | FAILURE_MODE_ID               | Integer   | YES      | NO     |             |

## Relationships

| Relationship name | Type        | Parent entity              | Child entity                               | Card. |
|-------------------|-------------|----------------------------|--|-------|
| Relationship70    | Identifying | FAILURE_MODE               | FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION | 1:N   |
| Relationship69    | Identifying | GENERAL_MAINTENANCE_ACTION | FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION | 1:N   |

## Entity 'GEN\_COMP\_REQ\_GEN\_MAINT'

|                    |                        |
|--------------------|------------------------|
| <b>Entity name</b> | GEN_COMP_REQ_GEN_MAINT |
| <b>Entity type</b> | dependent              |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name           | Data type     | Not null | Unique | Description   |
|-----|-------------------------------|---------------|----------|--------|---|
| PFK | COMPONENT_ID                  | Number        | YES      | NO     |   |
| PFK | GENERAL_MAINTENANCE_ACTION_ID | Integer       | YES      | NO     |   |
|     | INTERVAL_HOURS                | Integer       | NO       | NO     | The interval of the required maintenance action (in operating hours) - if applicable.         |
|     | INTERVAL_DAYS                 | Integer       | NO       | NO     | The interval of the required maintenance action (in operating calendar days) - if applicable. |
|     | INTERVAL_EACH_USE             | Binary_Double | NO       | NO     | A flag indicating that the maintenance action is required for each use of the component.      |

## Relationships

| Relationship name | Type        | Parent entity              | Child entity           | Card. |
|-------------------|-------------|----------------------------|------------------------|-------|
| Relationship90    | Identifying | COMPONENT                  | GEN_COMP_REQ_GEN_MAINT | 1:N   |
| Relationship91    | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_COMP_REQ_GEN_MAINT | 1:N   |

## Description

This entity specifies which PARTS are required for a GENERAL\_MAINTENANCE\_ACTION. Used to help forecast what parts may/are required for future failures.

## Entity 'GEN\_COMPONENT\_REQ\_GEN\_MAINT'

|                    |                             |
|--------------------|-----------------------------|
| <b>Entity name</b> | GEN_COMPONENT_REQ_GEN_MAINT |
| <b>Entity type</b> | dependent                   |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name           | Data type     | Not null | Unique | Description   |
|-----|-------------------------------|---------------|----------|--------|---|
| PFK | GENERAL_COMPONENT_ID          | Integer       | YES      | NO     |   |
| PFK | GENERAL_MAINTENANCE_ACTION_ID | Integer       | YES      | NO     |   |
|     | INTERVAL_HOURS                | Integer       | NO       | NO     | The interval of the required maintenance action (in operating hours) - if applicable.         |
|     | INTERVAL_DAYS                 | Integer       | NO       | NO     | The interval of the required maintenance action (in operating calendar days) - if applicable. |
|     | INTERVAL_EACH_USE             | Binary_Double | NO       | NO     | A flag indicating that the maintenance action is required for each use of the component.      |

## Relationships

| Relationship name | Type        | Parent entity              | Child entity                | Card. |
|-------------------|-------------|----------------------------|-----------------------------|-------|
| Relationship92    | Identifying | GENERAL_COMPONENT          | GEN_COMPONENT_REQ_GEN_MAINT | 1:N   |
| Relationship94    | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_COMPONENT_REQ_GEN_MAINT | 1:N   |

## Description

This entity specifies which GENERAL\_COMPONENTS are required for a GENERAL\_MAINTENANCE\_ACTION. Used to help forecast what parts may/are required for future failures.

## Entity 'GEN\_COMPONENT\_STATE\_DESCRIPTOR'

|                    |                                |
|--------------------|--------------------------------|
| <b>Entity name</b> | GEN_COMPONENT_STATE_DESCRIPTOR |
| <b>Entity type</b> | dependent                      |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name  | Data type | Not null | Unique | Description |
|-----|----------------------|-----------|----------|--------|-------------|
| PFK | GENERAL_COMPONENT_ID | Integer   | YES      | NO     |             |
| PFK | STATE_DESCRIPTOR_ID  | Integer   | YES      | NO     |             |

## Relationships

| Relationship name | Type        | Parent entity     | Child entity                   | Card. |
|-------------------|-------------|-------------------|--------------------------------|-------|
| Relationship106   | Identifying | GENERAL_COMPONENT | GEN_COMPONENT_STATE_DESCRIPTOR | 1:N   |
| Relationship107   | Identifying | STATE_DESCRIPTOR  | GEN_COMPONENT_STATE_DESCRIPTOR | 1:N   |

## Description

A table used to track which GENERAL\_COMPONENTS are tracked by which STATE\_DESCRIPTORs. A STATE\_DESCRIPTOR can describe more than one component. As a rule, state descriptors are tracked only for the highest level component group. All subordinate components inherit the state descriptors of higher components. For example, VERTICAL\_AIRSPEED is tracked for the aircraft, and all components that are part of the aircraft share this state. State descriptors must be recorded separately for components that aren't within the same work unit code. For example, state descriptor TAIL\_ROTOR\_RPM would be assigned to the TAIL\_ROTOR HEAD assembly (hypothetical Group 05) as well as the TAIL\_ROTOR\_BLADE assembly (hypothetical group 07). However, the TAIL\_ROTOR\_RPM state descriptor would not be assigned to any subordinate components in these groups -i.e. TAIL\_ROTOR\_RPM for the TAIL\_ROTOR\_PITCH\_LINKS (hypothetical group 07A) would not be recorded.

## Entity 'GEN\_MAINT\_ACTION\_REQ\_GEN\_PERSON'

|                    |                                 |
|--------------------|---------------------------------|
| <b>Entity name</b> | GEN_MAINT_ACTION_REQ_GEN_PERSON |
| <b>Entity type</b> | dependent                       |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name           | Data type | Not null | Unique | Description  |
|-----|-------------------------------|-----------|----------|--------|--|
| PK  | MAINTENANCE_ACTION_ID         | Integer   | YES      | NO     | Foreign key of maintenance action requiring personnel  |
| PK  | MAINTENANCE_PERSON_ID         | Integer   | YES      | NO     | Foreign key of maintenance person performing maintenance action                                      |
|     | QUANTITY_REQUIRED             | Integer   | NO       | NO     | Number of maintenance personnel required   |
|     | ESTIMATED_MAN_HOURS           | Integer   | NO       | NO     | Estimated number of total man hours for this category of personnel                                   |
|     | ADDITIONAL_SKILLS_REQUIRED    | Varchar2  | NO       | NO     | Additional skills (local in nature - i.e. unit specific licensing, time in unit, specific team, etc) |
| PFK | GENERAL_MAINTENANCE_ACTION_ID | Integer   | YES      | NO     |  |
| PFK | GEN_MAINTENANCE_PERSON_ID     | Integer   | YES      | NO     |  |

## Relationships

| Relationship name | Type        | Parent entity              | Child entity                    | Card. |
|-------------------|-------------|----------------------------|---------------------------------|-------|
| Relationship86    | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_MAINT_ACTION_REQ_GEN_PERSON | 1:N   |
| Relationship117   | Identifying | GENERAL_MAINTENANCE_PERSON | GEN_MAINT_ACTION_REQ_GEN_PERSON | 1:N   |

## Description

Used to specify what standard/predetermined personnel are needed to complete a certain maintenance activity. This information is used to help plan and predict what components are required for certain maintenance tasks.

## Entity 'GEN\_MAINT\_REQ\_PUBLICATION'

|                    |                           |
|--------------------|---------------------------|
| <b>Entity name</b> | GEN_MAINT_REQ_PUBLICATION |
| <b>Entity type</b> | dependent                 |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name           | Data type | Not null | Unique | Description |
|-----|-------------------------------|-----------|----------|--------|-------------|
| PFK | GENERAL_MAINTENANCE_ACTION_ID | Integer   | YES      | NO     |             |
| PFK | PUBLICATION_ID                | Integer   | YES      | NO     |             |

## Relationships

| Relationship name | Type        | Parent entity              | Child entity              | Card. |
|-------------------|-------------|----------------------------|---------------------------|-------|
| Relationship119   | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_MAINT_REQ_PUBLICATION | 1:N   |
| Relationship120   | Identifying | PUBLICATION                | GEN_MAINT_REQ_PUBLICATION | 1:N   |

## Description

Used to specify what standard/predetermined tools and supplies are needed to complete a certain maintenance activity. This information is used to help plan and predict what is needed for certain maintenance tasks.

## Entity 'GEN\_MAINT\_REQ\_TOOL'

|                    |                    |
|--------------------|--------------------|
| <b>Entity name</b> | GEN_MAINT_REQ_TOOL |
| <b>Entity type</b> | dependent          |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name           | Data type | Not null | Unique | Description                                       |
|-----|-------------------------------|-----------|----------|--------|---|
| PFK | TOOL_ID                       | Integer   | YES      | NO     | Foreign key of tool performing maintenance action |
| PFK | GENERAL_MAINTENANCE_ACTION_ID | Integer   | YES      | NO     |   |
|     | QUANTITY_REQUIRED             | Integer   | NO       | NO     | Number of tools required                          |

## Relationships

| Relationship name                    | Type        | Parent entity              | Child entity       | Card. |
|--------------------------------------|-------------|----------------------------|--------------------|-------|
| TOOLMAINTENANCE_ACTION_REQUIRES_TOOL | Identifying | TOOL                       | GEN_MAINT_REQ_TOOL | 1:N   |
| Relationship85                       | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_MAINT_REQ_TOOL | 1:N   |

## Description

Used to specify what standard/predetermined tools and supplies are needed to complete a certain maintenance activity. This information is used to help plan and predict what is needed for certain maintenance tasks.

Entity 'GENERAL\_COMPONENT'

|                    |                   |
|--------------------|-------------------|
| <b>Entity name</b> | GENERAL_COMPONENT |
| <b>Entity type</b> | independent       |

**User-defined variables**

| <b>Name</b>                         | <b>Value</b> |
|-------------------------------------|--------------|
| Owner                               |              |
| Tablespace for Primary key          |              |
| Primary Key Deferrable              | No           |
| Primary Key Initially Deferred      | No           |
| Tablespace for Table                |              |
| Name of Using Index for Primary key |              |



**Attributes**

| Key | Attribute/role name           | Data type | Not null | Unique | Description   |
|-----|-------------------------------|-----------|----------|--------|---|
| PK  | GENERAL_COMPONENT_ID          | Integer   | YES      | NO     | Unique identifier (CBM_UDM specific) for the GENERAL_COMPONENT entity.  |
|     | HIGHER_GENERAL_COMPONENT_ID   | Integer   | NO       | NO     | The GENERAL_COMPONENT_ID of the next higher assembly.   |
|     | QTY_PER_HIGHER                | Integer   | NO       | NO     | The quantity of GENERAL_COMPONENTS per the next higher GENERAL_COMPONENT.   |
| FK  | CAGE                          | Varchar2  | YES      | NO     | COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE - The Commercial and Government Entity (CAGE) Code is a five-character code assigned by the Defense Logistics Information Service (DLIS) to the design control activity or actual manufacturer of an item.         |
|     | LCN                           | Varchar2  | NO       | NO     | LOGISTIC SUPPORT ANALYSIS CONTROL NUMBER (LCN) - A code that represents a functional or hardware generation breakdown/disassembly sequence of system/equipment hardware including SE, training equipment, and installation (connecting) hardware.               |
|     | ALT_LCN                       | Varchar2  | NO       | NO     | ALTERNATE LOGISTIC SUPPORT ANALYSIS CONTROL NUMBER CODE - A code used to allow documentation of multiple models of a system/ equipment, or alternate design considerations of an item, using the same Logistic Support Analysis Control Number (LCN) breakdown. |
|     | WUC                           | Varchar2  | YES      | NO     | WORK UNIT CODE. A code describing what major assembly a component belongs to. Defines a physical slot on the end item where a component is placed. Can be populated by multiple part numbers.   |
|     | PART_NUMBER                   | Varchar2  | YES      | NO     | Unique identifier for a component type. This field may contain a 13-digit FSC/NIIN, ACVC, Manufacturer's Control Number, or a part number of variable length. This is the part number for the repair part used.   |
|     | WUC_NOUN                      | Varchar2  | NO       | NO     | Nomenclature or description of work unit code.  |
|     | POSITION_CODE                 | Integer   | NO       | NO     | Position code for the component.  |
|     | NOMENCLATURE                  | Varchar2  | NO       | NO     | NOMENCLATURE - The descriptive name of an item, usually identifying some characteristics of the item.   |
|     | FEDERAL_SUPPLY_CLASSIFICATION | Varchar2  | NO       | NO     | FEDERAL SUPPLY CLASSIFICATION - First four digits of the NATIONAL STOCK NUMBER (NSN)  |
|     | NIIN                          | Varchar2  | NO       | NO     | NATIONAL ITEM IDENTIFICATION NUMBER - Nine-digit number sequentially assigned to each approved item identification number under the federal cataloging program.   |
|     | SERIAL_ITEM                   | Varchar2  | NO       | NO     | Indicates ABSTRACT_COMPONENT is a "serial numbered" item  |
|     | UNIT_OF_ISSUE                 | Varchar2  | NO       | NO     | UNIT OF ISSUE CODE - A two-position, alphabetic code that represents the definite amount or   |

|  |                         |                  |    |    |  |
|--|-------------------------|------------------|----|----|--|
|  |                         |                  |    |    | quantity of an item that will be issued.   |
|  | LOCATION_X              | Double precision | NO | NO | Lateral location of the component reference the aircraft datum.  |
|  | LOCATION_Y              | Double precision | NO | NO | Longitudinal location of the component relative to the aircraft datum.   |
|  | LOCATION_Z              | Double precision | NO | NO | Vertical position of the component relative to the aircraft datum.   |
|  | CD_CONFIG               | Number           | NO | NO | ULLS-A Configuration Code  |
|  | CD_CHANGE_TYPE          | Number           | NO | NO | ULLS-A - TYPE= TC TBO, RC FINITE LIFE, CC CONDIT   |
|  | FLIGHT_SAFETY_COMPONENT | Char             | NO | NO | Component is a flight critical component (Y=Yes; N=No)   |
|  | MAX_OPERATING_TIME      | Number           | NO | NO | Maximum allowable operating time of the component (in hours).  |
|  | UNIT_PRICE              | Number           | NO | NO | Current price of unit.   |
|  | REMARKS                 | Varchar2         | NO | NO | Additional remarks about the component.  |
|  | RESET_COMPONENT         | Varchar2         | NO | NO | Component is part of the AED Reset Program (Y=yes; N=no)   |
|  | SBO                     | Varchar2         | NO | NO | ULLS-A   |
|  | SOURCE_OF_SUPPLY        | Varchar2         | NO | NO | SOURCE OF SUPPLY (SOS) CODE - Identifies a specific supply and distribution organization by its military service / governmental ownership and geographical location. The Source of Supply (SOS) code is used to identify the activity that is to receive requisitions for a given item of supply. The activity can be an Army wholesale supply organization or another federal agency. |
|  | SYS_CATEGORY            | Varchar2         | NO | NO | MCDS30 Directory for this part.  |
|  | UNDER_WARRANTY          | Varchar2         | NO | NO | ULLS-A Warranty Indicator.   |
|  | WARRANTY_DAYS           | Number           | NO | NO | ULLS-A Warranty period in days.  |
|  | ASSEMBLY_LEVEL          | Number           | NO | NO | Assembly level based on WUC.   |
|  | CMB_CERTIFIED           | Varchar2         | NO | NO | Component is contact memory button verified.   |
|  | DA2410_ITEM             | Varchar2         | NO | NO | Component is required to be tracked by DA FORM 2410.   |
|  | LOCAL_TRACKED           | Varchar2         | NO | NO | Component's locally tracked value pulled from DA FORM 2410 (Y=L on 2410, N= No L on 2410).   |
|  | SN_VISUALLY_VERIFIED    | Varchar2         | NO | NO | Serial number of the component can be visually verified, (Y=yes; N=No).  |

**Relationships**

| Relationship name                                       | Type            | Parent entity     | Child entity                                  | Card. |
|---|-----------------|-------------------|---|-------|
| ABSTRACT_COMPONENTCOMPONENT                             | Non-identifying | GENERAL_COMPONENT | COMPONENT                                     | 1:N   |
| ABSTRACT_COMPONENTMAINTENANCE_ACTION_REQUIRES_COMPONENT | Identifying     | GENERAL_COMPONENT | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | 1:N   |
| Relationship52  | Identifying     | GENERAL_COMPONENT | MAINT_ACTION_REQ_GEN_COMPONENT                | 1:N   |
| Relationship78  | Non-identifying | GENERAL_COMPONENT | FAILURE_MODE                                  | 1:N   |
| Relationship92  | Identifying     | GENERAL_COMPONENT | GEN_COMPONENT_REQ_GEN_MAINT                   | 1:N   |
| Relationship97  | Non-identifying | MANUFACTURER      | GENERAL_COMPONENT                             | 1:N   |
| Relationship106   | Identifying     | GENERAL_COMPONENT | GEN_COMPONENT_STATE_DESCRIPTOR                | 1:N   |

**Description**

A hypothetical component or part that is included in the design of the aircraft. This entity is used to specify all possible components in the maintenance system. Example- "HELICOPTER: AH64 ATTACK" is a general component without an aircraft serial #.

## Entity 'GENERAL\_MAINTENANCE\_ACTION'

|                    |                            |
|--------------------|----------------------------|
| <b>Entity name</b> | GENERAL_MAINTENANCE_ACTION |
| <b>Entity type</b> | independent                |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name           | Data type | Not null | Unique | Description   |
|-----|-------------------------------|-----------|----------|--------|---|
| PK  | GENERAL_MAINTENANCE_ACTION_ID | Integer   | YES      | NO     | Unique identifier (CBM_UDM specific) for GENERAL_MAINTENANCE_ACTION entities                      |
|     | NARRATIVE                     | Long      | NO       | NO     | Narrative of the general maintenance action - e.g. "Aircraft Wash"                                |
|     | MAINTENANCE_ACTION_TYPE       | Varchar2  | NO       | NO     | Type of maintenance action (Rebuild, replacement, modification, inspection, repair, installation) |
|     | ESTIMATED_HOURS               | Integer   | NO       | NO     | Estimated length of action - in hours   |
|     | STATUS                        | Varchar2  | NO       | NO     | DA PAM 738-751 status of maintenance action (if it becomes a real maintenance action)             |
|     | PUBLICATION_ID                | Integer   | NO       | NO     | Foreign key link to PUBLICATION governing maintenance action                                      |
|     | PARENT_MAINTENANCE_ACTION_ID  | Integer   | NO       | NO     | Foreign key to parent MAINTENANCE_ACTION  |

## Relationships

| Relationship name | Type        | Parent entity              | Child entity                               | Card. |
|-------------------|-------------|----------------------------|--|-------|
| Relationship51    | Identifying | GENERAL_MAINTENANCE_ACTION | MAINT_ACTION_REQ_GEN_COMPONENT             | 1:N   |
| Relationship69    | Identifying | GENERAL_MAINTENANCE_ACTION | FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION | 1:N   |
| Relationship85    | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_MAINT_REQ_TOOL                         | 1:N   |
| Relationship86    | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_MAINT_ACTION_REQ_GEN_PERSON            | 1:N   |
| Relationship91    | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_COMP_REQ_GEN_MAINT                     | 1:N   |
| Relationship94    | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_COMPONENT_REQ_GEN_MAINT                | 1:N   |
| Relationship119   | Identifying | GENERAL_MAINTENANCE_ACTION | GEN_MAINT_REQ_PUBLICATION                  | 1:N   |

## Description

A general maintenance action or event that a component might experience. Includes inspections, repairs, rebuilds, replacements, etc. Used for planning and prediction purposes.



## Entity 'GENERAL\_MAINTENANCE\_PERSON'

|                    |                            |
|--------------------|----------------------------|
| <b>Entity name</b> | GENERAL_MAINTENANCE_PERSON |
| <b>Entity type</b> | independent                |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name        | Data type | Not null | Unique | Description   |
|-----|----------------------------|-----------|----------|--------|---|
| PK  | GEN_MAINTENANCE_PERSON_ID  | Integer   | YES      | NO     | Unique identifier (CBM_UDM specific)                  |
|     | MTOE_PARAGRAPH             | Varchar2  | NO       | NO     | MTO&E Paragraph of maintenance person (if applicable) |
|     | MTOE_LINE                  | Varchar2  | NO       | NO     | MTO&E Line of maintenance person (if applicable)      |
|     | MOS                        | Varchar2  | NO       | NO     | Mission Occupational Specialty of person              |
|     | RANK                       | Varchar2  | NO       | NO     | Rank of maintenance person                            |
|     | ADDITIONAL_SKILLS_COMMENTS | Varchar2  | NO       | NO     | Information regarding additional skills required.     |
|     | FLIGHT_STATUS              | Varchar2  | NO       | NO     | Flight status of maintenance person                   |

## Relationships

| Relationship name | Type        | Parent entity              | Child entity                    | Card. |
|-------------------|-------------|----------------------------|---------------------------------|-------|
| Relationship116   | Identifying | GENERAL_MAINTENANCE_PERSON | MAINTENANCE_PERSON              | 1:N   |
| Relationship117   | Identifying | GENERAL_MAINTENANCE_PERSON | GEN_MAINT_ACTION_REQ_GEN_PERSON | 1:N   |

## Description

A position or abstract person involved with maintenance. Examples - Maintainer, Inspector, Test Pilot, Technician, etc.

## Entity 'MAINT\_ACTION\_INVOLVES\_COMP'

|                    |                            |
|--------------------|----------------------------|
| <b>Entity name</b> | MAINT_ACTION_INVOLVES_COMP |
| <b>Entity type</b> | dependent                  |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name   | Data type | Not null | Unique | Description |
|-----|-----------------------|-----------|----------|--------|-------------|
| PFK | MAINTENANCE_ACTION_ID | Integer   | YES      | NO     |             |
| PFK | COMPONENT_ID          | Number    | YES      | NO     |             |

## Relationships

| Relationship name | Type        | Parent entity      | Child entity               | Card. |
|-------------------|-------------|--------------------|----------------------------|-------|
| Relationship66    | Identifying | COMPONENT          | MAINT_ACTION_INVOLVES_COMP | 1:N   |
| Relationship26    | Identifying | MAINTENANCE_ACTION | MAINT_ACTION_INVOLVES_COMP | 1:N   |

## Description

This entity tracks what actual components were involved with a particular maintenance action. For example a particular hose might have been used (replaced) during a hydraulic pump replacement.

## Entity 'MAINT\_ACTION\_INVOLVES\_PERSON'

|                    |                              |
|--------------------|------------------------------|
| <b>Entity name</b> | MAINT_ACTION_INVOLVES_PERSON |
| <b>Entity type</b> | dependent                    |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name        | Data type | Not null | Unique | Description  |
|-----|----------------------------|-----------|----------|--------|--|
| PFK | MAINTENANCE_PERSON_ID      | Integer   | YES      | NO     | Foreign key of maintenance person performing maintenance action                                      |
| PFK | MAINTENANCE_ACTION_ID      | Integer   | YES      | NO     | Foreign key of maintenance action requiring personnel  |
|     | QUANTITY_REQUIRED          | Integer   | NO       | NO     | Number of maintenance personnel required   |
|     | MAN_HOURS                  | Integer   | NO       | NO     | Number of total man hours for this category of personnel actually expended.                          |
|     | ADDITIONAL_SKILLS_REQUIRED | Varchar2  | NO       | NO     | Additional skills (local in nature - i.e. unit specific licensing, time in unit, specific team, etc) |
| PFK | GEN_MAINTENANCE_PERSON_ID  | Integer   | YES      | NO     |  |

## Relationships

| Relationship name | Type        | Parent entity      | Child entity                 | Card. |
|-------------------|-------------|--------------------|------------------------------|-------|
| Relationship28    | Identifying | MAINTENANCE_ACTION | MAINT_ACTION_INVOLVES_PERSON | 1:N   |
| Relationship40    | Identifying | MAINTENANCE_PERSON | MAINT_ACTION_INVOLVES_PERSON | 1:N   |

## Description

This entity tracks what actual personnel were involved with a particular maintenance action. For example a particular crew chief (SGT Rock) might have conducted a hydraulic pump repair.



## Entity 'MAINT\_ACTION\_REQ\_GEN\_COMPONENT'

|                    |                                |
|--------------------|--------------------------------|
| <b>Entity name</b> | MAINT_ACTION_REQ_GEN_COMPONENT |
| <b>Entity type</b> | dependent                      |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name           | Data type | Not null | Unique | Description |
|-----|-------------------------------|-----------|----------|--------|-------------|
| PFK | GENERAL_MAINTENANCE_ACTION_ID | Integer   | YES      | NO     |             |
| PFK | GENERAL_COMPONENT_ID          | Integer   | YES      | NO     |             |
|     | QUANTITY                      | Integer   | NO       | NO     |             |

## Relationships

| Relationship name | Type        | Parent entity              | Child entity                   | Card. |
|-------------------|-------------|----------------------------|--------------------------------|-------|
| Relationship52    | Identifying | GENERAL_COMPONENT          | MAINT_ACTION_REQ_GEN_COMPONENT | 1:N   |
| Relationship51    | Identifying | GENERAL_MAINTENANCE_ACTION | MAINT_ACTION_REQ_GEN_COMPONENT | 1:N   |

## Description

This entity specifies which GENERAL\_COMPONENTS are required for a GENERAL\_MAINTENANCE\_ACTION. Used to help forecast what parts may/are required for future failures.

## Entity 'MAINTENANCE\_ACTION'

|                    |                    |
|--------------------|--------------------|
| <b>Entity name</b> | MAINTENANCE_ACTION |
| <b>Entity type</b> | independent        |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name          | Data type | Not null | Unique | Description  |
|-----|------------------------------|-----------|----------|--------|--|
| PK  | MAINTENANCE_ACTION_ID        | Integer   | YES      | NO     | Unique identifier (CBM_UDM specific) for MAINTENANCE_ACTION entities   |
|     | PARENT_MAINTENANCE_ACTION_ID | Integer   | YES      | NO     | A foreign key linking the MAINTENANCE_ACTION to a parent MAINTENANCE_ACTION. For example, an engine replacement might involve replacing connecting sub components. |
|     | NARRATIVE                    | Long      | YES      | NO     | Narrative of the maintenance action  |
|     | MAINTENANCE_ACTION_TYPE      | Varchar2  | YES      | NO     | Type of maintenance action (Rebuild, replacement, modification, inspection, repair, installation)  |
|     | START_DTG                    | Date      | YES      | NO     | Start DTG of maintenance action  |
|     | END_DTG                      | Date      | NO       | NO     | End DTG of maintenance action  |
|     | STATUS                       | Varchar2  | YES      | NO     | Status of maintenance action IAW DA PAM 738-751  |
|     | PUBLICATION_ID               | Integer   | NO       | NO     | Foreign key link to PUBLICATION governing maintenance action   |
|     | NLT_DTG                      | Date      | NO       | NO     | No later than (NLT) Date Time Group of when the maintenance action must be accomplished  |
|     | NLT_AIRCRAFT_HOURS           | Integer   | NO       | NO     | No later than (NLT) Aircraft Hours when maintenance action must be accomplished  |
|     | NET_DTG                      | Date      | NO       | NO     | No earlier than (NET) Date Time Group of when the maintenance action must be accomplished  |
|     | NET_AIRCRAFT_HOURS           | Float     | NO       | NO     | No earlier than (NET) Aircraft Hours when maintenance action must be accomplished  |

## Relationships

| Relationship name   | Type        | Parent entity      | Child entity                                  | Card. |
|---|-------------|--------------------|---|-------|
| MAINTENANCE_ACTIONMAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | Identifying | MAINTENANCE_ACTION | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | 1:N   |
| Relationship24  | Identifying | MAINTENANCE_ACTION | MAINTENANCE_ACTION_ADDRESSES_FAILURE          | 1:N   |
| Relationship26  | Identifying | MAINTENANCE_ACTION | MAINT_ACTION_INVOLVES_COMP                    | 1:N   |
| Relationship28  | Identifying | MAINTENANCE_ACTION | MAINT_ACTION_INVOLVES_PERSON                  | 1:N   |

**Description**

A specific maintenance action or event that involves one or more components. Includes inspections, repairs, rebuilds, replacements, etc. Can be a past, present, or future (scheduled) activity.

## Entity 'MAINTENANCE\_ACTION\_ADDRESSES\_FAILURE'

|                    |                                      |
|--------------------|--------------------------------------|
| <b>Entity name</b> | MAINTENANCE_ACTION_ADDRESSES_FAILURE |
| <b>Entity type</b> | dependent                            |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name   | Data type | Not null | Unique | Description |
|-----|-----------------------|-----------|----------|--------|-------------|
| PFK | FAILURE_ID            | Integer   | YES      | NO     |             |
| PFK | MAINTENANCE_ACTION_ID | Integer   | YES      | NO     |             |
| PFK | COMPONENT_ID          | Number    | YES      | NO     |             |

## Relationships

| Relationship name | Type        | Parent entity      | Child entity                         | Card. |
|-------------------|-------------|--------------------|--------------------------------------|-------|
| Relationship23    | Identifying | FAILURE            | MAINTENANCE_ACTION_ADDRESSES_FAILURE | 1:N   |
| Relationship24    | Identifying | MAINTENANCE_ACTION | MAINTENANCE_ACTION_ADDRESSES_FAILURE | 1:N   |

## Description

Used to link what MAINTENANCE\_ACTIONS were conducted in response to failures. This is important to link maintenance with failure and usage, as not all MAINTENANCE\_ACTIONS are in response to failures.

## Entity 'MAINTENANCE\_ACTION\_REQUIRES\_GENERAL\_COMPONENT'

|                    |   |
|--------------------|---|
| <b>Entity name</b> | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT |
| <b>Entity type</b> | dependent                                     |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name   | Data type | Not null | Unique | Description  |
|-----|-----------------------|-----------|----------|--------|--|
| PFK | MAINTENANCE_ACTION_ID | Integer   | YES      | NO     | Foreign key of maintenance action requiring the abstract component |
| PFK | GENERAL_COMPONENT_ID  | Integer   | YES      | NO     | Foreign key of abstract component addressing maintenance action    |
|     | REPLACED_PART_ID      | Integer   | NO       | NO     | Foreign key of component replaced                                  |
|     | SATISFYING_PART_ID    | Integer   | NO       | NO     | Foreign key of satisfying component ID                             |

## Relationships

| Relationship name   | Type        | Parent entity                                 | Child entity                                  | Card. |
|---|-------------|---|---|-------|
| ABSTRACT_COMPONENTMAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | Identifying | GENERAL_COMPONENT                             | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | 1:N   |
| MAINTENANCE_ACTIONMAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | Identifying | MAINTENANCE_ACTION                            | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | 1:N   |
| Relationship67  | Informative | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | COMPONENT                                     | 1:N   |

## Description

Used to specify what standard/predetermined general components are needed to complete a certain maintenance activity. This information is used to help plan and predict what components are required for certain maintenance activities.

## Entity 'MAINTENANCE\_PERSON'

|                    |                    |
|--------------------|--------------------|
| <b>Entity name</b> | MAINTENANCE_PERSON |
| <b>Entity type</b> | dependent          |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name       | Data type | Not null | Unique | Description                          |
|-----|---------------------------|-----------|----------|--------|--------------------------------------|
| PK  | MAINTENANCE_PERSON_ID     | Integer   | YES      | NO     | Unique identifier (CBM_UDM specific) |
|     | LAST_NAME                 | Varchar2  | NO       | NO     |                                      |
|     | FIRST_NAME                | Varchar2  | NO       | NO     |                                      |
|     | PID                       | Varchar2  | NO       | NO     |                                      |
| PFK | GEN_MAINTENANCE_PERSON_ID | Integer   | YES      | NO     |                                      |

## Relationships

| Relationship name | Type        | Parent entity              | Child entity                 | Card. |
|-------------------|-------------|----------------------------|------------------------------|-------|
| Relationship40    | Identifying | MAINTENANCE_PERSON         | MAINT_ACTION_INVOLVES_PERSON | 1:N   |
| Relationship116   | Identifying | GENERAL_MAINTENANCE_PERSON | MAINTENANCE_PERSON           | 1:N   |

## Description

A position or abstract person involved with maintenance. Examples - Maintainer, Inspector, Test Pilot, Technician, etc.

## Entity 'MANUFACTURER'

|                    |              |
|--------------------|--------------|
| <b>Entity name</b> | MANUFACTURER |
| <b>Entity type</b> | independent  |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name   | Data type | Not null | Unique | Description   |
|-----|-----------------------|-----------|----------|--------|---|
| PK  | CAGE                  | Varchar2  | YES      | NO     | COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE - The Commercial and Government Entity (CAGE) Code is a five-character code assigned by the Defense Logistics Information Service (DLIS) to the design control activity or actual manufacturer of an item. |
|     | MANUFACTURER_NAME     | Varchar2  | NO       | NO     | Name of manufacturer  |
|     | MANUFACTURER_LOCATION | Varchar2  | NO       | NO     | Location of manufacturer  |
|     | MANUFACTURER_POC_INFO | Varchar2  | NO       | NO     | POC information for manufacture   |
|     | CONTRACT_NUMBER       | Varchar2  | NO       | NO     | CONTRACT NUMBER - If the ninth position of the contract number is a D or G, then a delivery order number is required, and the contract number will be 17 characters; otherwise, the contract number will be 13 characters.                              |

## Relationships

| Relationship name | Type            | Parent entity | Child entity      | Card. |
|-------------------|-----------------|---------------|-------------------|-------|
| Relationship97    | Non-identifying | MANUFACTURER  | GENERAL_COMPONENT | 1:N   |

## Description

A particular manufacturer of a component. For example - New Hampshire bearing corporation is a manufacturer for many helicopter bearings.

## Entity 'PUBLICATION'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | PUBLICATION |
| <b>Entity type</b> | independent |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name     | Data type | Not null | Unique | Description                       |
|-----|-------------------------|-----------|----------|--------|-----------------------------------|
| PK  | PUBLICATION_ID          | Integer   | YES      | NO     | Unique identifier for publication |
|     | PUBLICATION_TITLE       | Varchar2  | NO       | NO     | The title of the publications.    |
|     | PUBLICATION_PAMS_NUMBER | Varchar2  | NO       | NO     | NSN for publication               |

## Relationships

| Relationship name | Type        | Parent entity | Child entity              | Card. |
|-------------------|-------------|---------------|---------------------------|-------|
| Relationship120   | Identifying | PUBLICATION   | GEN_MAINT_REQ_PUBLICATION | 1:N   |

## Description

Any maintenance publication. Technical Manuals, Field manuals, SOPs, etc.



## Entity 'REGIME'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | REGIME      |
| <b>Entity type</b> | independent |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name      | Data type | Not null | Unique | Description  |
|-----|--------------------------|-----------|----------|--------|--|
| PK  | REGIME_ID                | Number    | YES      | NO     | Unique identifier (CBM_UDM specific) for each FLIGHT REGIME entity |
|     | REGIME_DESCRIPTOR        | Varchar2  | NO       | NO     | Full description of the REGIME                                     |
|     | REGIME_TITLE             | Varchar2  | NO       | NO     | Title or short description of REGIME                               |
|     | REFERENCE_PUBLICATION_ID | Number    | NO       | NO     | Foreign key of PUBLICATION describing REGIME                       |

## Relationships

| Relationship name | Type        | Parent entity | Child entity        | Card. |
|-------------------|-------------|---------------|---------------------|-------|
| Relationship82    | Identifying | REGIME        | USAGE_PERIOD_REGIME | 1:N   |

## Description

A particular profile or maneuver an end item might experience. In the future, will be described by one or more state descriptor trajectories.

## Entity 'STATE\_DESCRIPTOR'

|                    |                  |
|--------------------|------------------|
| <b>Entity name</b> | STATE_DESCRIPTOR |
| <b>Entity type</b> | independent      |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description   |
|-----|---------------------|-----------|----------|--------|---|
| PK  | STATE_DESCRIPTOR_ID | Integer   | YES      | NO     | Unique (CBMUDM specific) identifier for state descriptor    |
|     | SOURCE_SYSTEM       | Varchar2  | NO       | NO     | The data source for the state descriptor (MDR, VMEP, HUMS). |
|     | DESCRIPTION         | Varchar2  | NO       | NO     | A meaningful description of the state descriptor            |
|     | UNITS               | Varchar2  | NO       | NO     | Units state descriptor is measured in                       |
|     | REFERENCE           | Varchar2  | NO       | NO     | Governing reference or publication of state descriptor      |
|     | MIN_VALUE           | Number    | NO       | NO     | The minimum value for the state descriptor.                 |
|     | MAX_VALUE           | Number    | NO       | NO     | The maximum value for the state descriptor.                 |

## Relationships

| Relationship name | Type        | Parent entity    | Child entity                   | Card. |
|-------------------|-------------|------------------|--------------------------------|-------|
| Relationship107   | Identifying | STATE_DESCRIPTOR | GEN_COMPONENT_STATE_DESCRIPTOR | 1:N   |
| Relationship113   | Identifying | STATE_DESCRIPTOR | USAGE_PERIOD_STATE_DESCRIPTOR  | 1:N   |

## Description

An entity used to describe the physical state of an abstract component. For example Temperature and Pressure are state descriptors that describe the state of a NOSE GEAR BOX on an AH64. A state descriptor might describe more than one component. As a rule, state descriptors are tracked only for the highest level component group. All subordinate components inherit the state descriptors of higher components. For example, VERTICAL AIRSPEED is tracked for the aircraft, and all components that are part of the aircraft share this state.

## Entity 'TOOL'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | TOOL        |
| <b>Entity type</b> | independent |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description                                       |
|-----|---------------------|-----------|----------|--------|---|
| PK  | TOOL_ID             | Integer   | YES      | NO     | Unique identifier (CBM_UDM specific) for the tool |
|     | TOOL_NOMENCLATURE   | Varchar2  | YES      | NO     | Description of the tool                           |
|     | NSN                 | Varchar2  | YES      | YES    | NSN of tool                                       |
|     | COST                | Integer   | YES      | NO     | Cost of tool                                      |

## Relationships

| Relationship name                    | Type        | Parent entity | Child entity       | Card. |
|--------------------------------------|-------------|---------------|--------------------|-------|
| TOOLMAINTENANCE_ACTION_REQUIRES_TOOL | Identifying | TOOL          | GEN_MAINT_REQ_TOOL | 1:N   |

## Description

A tool that might be needed or involved with a particular maintenance task.

Entity 'UNIT'

|                    |             |
|--------------------|-------------|
| <b>Entity name</b> | UNIT        |
| <b>Entity type</b> | independent |

**User-defined variables**

| <b>Name</b>                         | <b>Value</b> |
|-------------------------------------|--------------|
| Owner                               |              |
| Tablespace for Primary key          |              |
| Primary Key Deferrable              | No           |
| Primary Key Initially Deferred      | No           |
| Tablespace for Table                |              |
| Name of Using Index for Primary key |              |

**Attributes**

| Key | Attribute/role name | Data type | Not null | Unique | Description   |
|-----|---------------------|-----------|----------|--------|---|
| PK  | UIC                 | Varchar2  | YES      | NO     | UNIT IDENTIFICATION CODE - The Unit Identification Code (UIC) is a six-position, alphanumeric code that uniquely identifies a Department of Defense (DOD) organization as a "unit." The UIC is issued by the HQDA DCSOPS. |
|     | DESIGNATION         | Varchar2  | NO       | NO     | Designation of unit (e.g. 101st AVN BDE)  |
|     | PRESENT_LOCATION    | Varchar2  | NO       | NO     | A description of the Present Geographic Code (PRGEO).   |
|     | DODAAC              | Varchar2  | NO       | NO     | DEPARTMENT OF DEFENSE ACTIVITY ADDRESS CODE - A six-position, alphanumeric code that identifies a specific unit or activity authorized to requisition, receive supplies, or receive billing.                              |
|     | UNIT_DESCRIPTION    | Varchar2  | NO       | NO     | UNIT IDENTIFICATION CODE DESCRIPTION - A description of the Unit Identification Code (UIC).   |
|     | DODAAC_POC_NAME     | Varchar2  | NO       | NO     | DEPARTMENT OF DEFENSE ACTIVITY ADDRESS CODE POINT OF CONTACT NAME - The registered person to be contacted regarding the Department of Defense Activity Address Code (DODAAC).   |
|     | DODAAC_POC_PHONE    | Varchar2  | NO       | NO     | DEPARTMENT OF DEFENSE ACTIVITY ADDRESS CODE POINT OF CONTACT PHONE NUMBER - The phone number of the registered person to be contacted regarding the Department of Defense Activity Address Code (DODAAC).                 |
|     | DSS_ALOC            | Varchar2  | NO       | NO     | DIRECT SUPPORT SYSTEM/AIR LINE OF COMMUNICATION (DSS/ALOC) - A one-character, numeric code that indicates if a unit is DSS/ALOC or non-DSS/ALOC, and identifies the CCP that serves the unit.                             |
|     | COMPONENT_CODE      | Varchar2  | NO       | NO     | COMPONENT CODE - ASORTS uses the following codes: 1 (Active Army), 3 (USAR), 2 (ARNG), and 6 (AWRP). The component does not change if the unit is called to active duty from the Reserve or National Guard.               |
|     | MACOM_CODE          | Varchar2  | NO       | NO     | MAJOR ARMY COMMAND CODE (MACOM) - Identifies the Major Command or Department of the Army Staff Agency.  |
|     | PRESENT_GEO_CODE    | Varchar2  | NO       | NO     | PRESENT GEOGRAPHIC CODE - A four-position code that indicates the present geographic location.  |
|     | STATION_NAME        | Varchar2  | NO       | NO     | SHORT STATION NAME - A description of the Station Code.   |
|     | STATION_CODE        | Varchar2  | NO       | NO     | Code indicating home station of unit.   |

**Relationships**

| Relationship name | Type            | Parent entity | Child entity | Card. |
|-------------------|-----------------|---------------|--------------|-------|
| Relationship64    | Non-identifying | UNIT          | COMPONENT    | 1:N   |

**Description**

The "owning" unit, organization, or activity for a particular physical component. This could be the operational battalion where an aircraft is stationed, or a warehouse where a replacement transmission is stored.

## Entity 'USAGE\_PERIOD'

|                    |              |
|--------------------|--------------|
| <b>Entity name</b> | USAGE_PERIOD |
| <b>Entity type</b> | independent  |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name | Data type | Not null | Unique | Description  |
|-----|---------------------|-----------|----------|--------|--|
| PK  | USAGE_PERIOD_ID     | Number    | YES      | NO     | A unique (CBM_UDM specific ) identifier for the USAGE_PERIOD (Flight or run-up). |
| FK  | END_ITEM_ID         | Number    | YES      | NO     | Foreign key link to END_ITEM entity.   |
|     | START_DTG           | Timestamp | YES      | NO     | Date Time Group (DTG) in Greenwich Mean Time of start of usage period.           |
|     | END_DTG             | Timestamp | YES      | NO     | Date Time Group (DTG) in Greenwich Mean Time of completion of usage period.      |

## Relationships

| Relationship name | Type            | Parent entity | Child entity                      | Card. |
|-------------------|-----------------|---------------|-----------------------------------|-------|
| Relationship73    | Non-identifying | END_ITEM      | USAGE_PERIOD                      | 1:N   |
| Relationship87    | Identifying     | USAGE_PERIOD  | USAGE_PERIOD_R<br>EGIME           | 1:N   |
| Relationship112   | Identifying     | USAGE_PERIOD  | USAGE_PERIOD_S<br>TATE_DESCRIPTOR | 1:N   |

## Description

A USAGE\_PERIOD is a specific use of the aircraft. It can be a flight, run-up, etc.

## Entity 'USAGE\_PERIOD\_REGIME'

|                    |                     |
|--------------------|---------------------|
| <b>Entity name</b> | USAGE_PERIOD_REGIME |
| <b>Entity type</b> | dependent           |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name | Data type   | Not null | Unique | Description  |
|-----|---------------------|-------------|----------|--------|--|
| PFK | REGIME_ID           | Number      | YES      | NO     | A unique identifier for the FLIGHT_REGIME of interest  |
|     | REGIME_VALUE        | Number(x,y) | NO       | NO     | The REGIME value during the measured time period.      |
|     | START_DTG           | Timestamp   | NO       | NO     | Start Date Time Group (DTG) of the REGIME measurement. |
|     | END_DTG             | Timestamp   | NO       | NO     | End Date Time Group (DTG) of the REGIME measurement.   |
| PFK | USAGE_PERIOD_ID     | Number      | YES      | NO     |  |

## Relationships

| Relationship name | Type        | Parent entity | Child entity        | Card. |
|-------------------|-------------|---------------|---------------------|-------|
| Relationship82    | Identifying | REGIME        | USAGE_PERIOD_REGIME | 1:N   |
| Relationship87    | Identifying | USAGE_PERIOD  | USAGE_PERIOD_REGIME | 1:N   |

## Description

USAGE\_PERIOD\_REGIME is used to capture specific regime values recorded for the END\_ITEM during the USAGE\_PERIOD.

## Entity 'USAGE\_PERIOD\_STATE\_DESCRIPTOR'

|                    |                               |
|--------------------|-------------------------------|
| <b>Entity name</b> | USAGE_PERIOD_STATE_DESCRIPTOR |
| <b>Entity type</b> | dependent                     |

## User-defined variables

| Name                                | Value |
|-------------------------------------|-------|
| Owner                               |       |
| Tablespace for Primary key          |       |
| Primary Key Deferrable              | No    |
| Primary Key Initially Deferred      | No    |
| Tablespace for Table                |       |
| Name of Using Index for Primary key |       |

## Attributes

| Key | Attribute/role name    | Data type | Not null | Unique | Description  |
|-----|------------------------|-----------|----------|--------|--|
| PK  | USAGE_PERIOD_ID        | Number    | YES      | NO     |  |
| PK  | STATE_DESCRIPTOR_ID    | Integer   | YES      | NO     | FK linking to state descriptor that created the value.                 |
|     | STATE_DESCRIPTOR_VALUE | Number    | NO       | NO     | The value the state descriptor generated in the specified time window. |
|     | START_DTG              | Timestamp | NO       | NO     | The start time of the state descriptor recording.                      |
|     | END_DTG                | Timestamp | NO       | NO     | The end time of the state descriptor recording.                        |

## Relationships

| Relationship name | Type        | Parent entity    | Child entity                  | Card. |
|-------------------|-------------|------------------|-------------------------------|-------|
| Relationship112   | Identifying | USAGE_PERIOD     | USAGE_PERIOD_STATE_DESCRIPTOR | 1:N   |
| Relationship113   | Identifying | STATE_DESCRIPTOR | USAGE_PERIOD_STATE_DESCRIPTOR | 1:N   |

## Description

This entity tracks specific state descriptor recordings for a specific usage period (or mission).



## Relationship report

| Relationship name                                       | Relationship type | Parent entity              | Child entity                                  | Card. |
|---|-------------------|----------------------------|---|-------|
| ABSTRACT_COMPONENTCOMPONENT                             | Non-identifying   | GENERAL_COMPONENT          | COMPONENT                                     | 1:N   |
| ABSTRACT_COMPONENTMAINTENANCE_ACTION_REQUIRES_COMPONENT | Identifying       | GENERAL_COMPONENT          | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | 1:N   |
| COMPONENTCOMPONENT_INSTALLATION_RECORD                  | Informative       | COMPONENT                  | COMPONENT_INSTALLATION_RECORD                 | 1:N   |
| COMPONENTCOMPONENT_INSTALLATION_RECORD1                 | Informative       | COMPONENT                  | COMPONENT_INSTALLATION_RECORD                 | 1:N   |
| MAINTENANCE_ACTIONMAINTENANCE_ACTION_REQUIRES_COMPONENT | Identifying       | MAINTENANCE_ACTION         | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | 1:N   |
| Relationship106   | Identifying       | GENERAL_COMPONENT          | GEN_COMPONENT_STATE_DESCRIPTOR                | 1:N   |
| Relationship107   | Identifying       | STATE_DESCRIPTOR           | GEN_COMPONENT_STATE_DESCRIPTOR                | 1:N   |
| Relationship112   | Identifying       | USAGE_PERIOD               | USAGE_PERIOD_STATE_DESCRIPTOR                 | 1:N   |
| Relationship113   | Identifying       | STATE_DESCRIPTOR           | USAGE_PERIOD_STATE_DESCRIPTOR                 | 1:N   |
| Relationship115   | Non-identifying   | END_ITEM                   | AIRCRAFT                                      | 1:N   |
| Relationship116   | Identifying       | GENERAL_MAINTENANCE_PERSON | MAINTENANCE_PERSON                            | 1:N   |
| Relationship117   | Identifying       | GENERAL_MAINTENANCE_PERSON | GEN_MAINT_ACTION_REQ_GEN_PERSON               | 1:N   |
| Relationship119   | Identifying       | GENERAL_MAINTENANCE_ACTION | GEN_MAINT_REQ_PUBLICATION                     | 1:N   |
| Relationship120   | Identifying       | PUBLICATION                | GEN_MAINT_REQ_PUBLICATION                     | 1:N   |
| Relationship23  | Identifying       | FAILURE                    | MAINTENANCE_ACTION_ADDRESSES_FAILURE          | 1:N   |
| Relationship24  | Identifying       | MAINTENANCE_ACTION         | MAINTENANCE_ACTION_ADDRESSES_FAILURE          | 1:N   |
| Relationship26  | Identifying       | MAINTENANCE_ACTION         | MAINT_ACTION_INVOLVES_COMP                    | 1:N   |
| Relationship28  | Identifying       | MAINTENANCE_ACTION         | MAINT_ACTION_INVOLVES_PERSON                  | 1:N   |
| Relationship40  | Identifying       | MAINTENANCE_PERSON         | MAINT_ACTION_INVOLVES_PERSON                  | 1:N   |
| Relationship51  | Identifying       | GENERAL_MAINTENANCE_ACTION | MAINT_ACTION_REQ_GEN_COMPONENT                | 1:N   |
| Relationship52  | Identifying       | GENERAL_COMPONENT          | MAINT_ACTION_REQ_GEN_COMPONENT                | 1:N   |
| Relationship64  | Non-identifying   | UNIT                       | COMPONENT                                     | 1:N   |

|                                      |                 |   |  |     |
|--------------------------------------|-----------------|---|--|-----|
| Relationship65                       | Non-identifying | COMPONENT                                     | END_ITEM                                   | 1:1 |
| Relationship66                       | Identifying     | COMPONENT                                     | MAINT_ACTION_INVOLVES_COMP                 | 1:N |
| Relationship67                       | Informative     | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT | COMPONENT                                  | 1:N |
| Relationship69                       | Identifying     | GENERAL_MAINTENANCE_ACTION                    | FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION | 1:N |
| Relationship70                       | Identifying     | FAILURE_MODE                                  | FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION | 1:N |
| Relationship71                       | Non-identifying | FAILURE_MODE                                  | FAILURE                                    | 1:N |
| Relationship73                       | Non-identifying | END_ITEM                                      | USAGE_PERIOD                               | 1:N |
| Relationship78                       | Non-identifying | GENERAL_COMPONENT                             | FAILURE_MODE                               | 1:N |
| Relationship82                       | Identifying     | REGIME  | USAGE_PERIOD_REGIME                        | 1:N |
| Relationship84                       | Identifying     | COMPONENT                                     | FAILURE                                    | 1:N |
| Relationship85                       | Identifying     | GENERAL_MAINTENANCE_ACTION                    | GEN_MAINT_REQ_TOOL                         | 1:N |
| Relationship86                       | Identifying     | GENERAL_MAINTENANCE_ACTION                    | GEN_MAINT_ACTION_REQ_GEN_PERSON            | 1:N |
| Relationship87                       | Identifying     | USAGE_PERIOD                                  | USAGE_PERIOD_REGIME                        | 1:N |
| Relationship90                       | Identifying     | COMPONENT                                     | GEN_COMP_REQ_GEN_MAINT                     | 1:N |
| Relationship91                       | Identifying     | GENERAL_MAINTENANCE_ACTION                    | GEN_COMP_REQ_GEN_MAINT                     | 1:N |
| Relationship92                       | Identifying     | GENERAL_COMPONENT                             | GEN_COMPONENT_REQ_GEN_MAINT                | 1:N |
| Relationship94                       | Identifying     | GENERAL_MAINTENANCE_ACTION                    | GEN_COMPONENT_REQ_GEN_MAINT                | 1:N |
| Relationship97                       | Non-identifying | MANUFACTURER                                  | GENERAL_COMPONENT                          | 1:N |
| TOOLMAINTENANCE_ACTION_REQUIRES_TOOL | Identifying     | TOOL  | GEN_MAINT_REQ_TOOL                         | 1:N |

## Relationship 'ABSTRACT\_COMPONENTCOMPONENT'

|                          |                             |                    |     |
|--------------------------|-----------------------------|--------------------|-----|
| <b>Relationship name</b> | ABSTRACT_COMPONENTCOMPONENT |                    |     |
| <b>Relationship type</b> | non-identifying             | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_COMPONENT           |                    |     |
| <b>Child entity</b>      | COMPONENT                   |                    |     |

**Partiality**

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | optional  |

**Referential integrity**

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | CASCADE       | CASCADE       |
| <b>Child</b>  | NONE          | NONE          | ----          |

**Keys**

|                 |                          |                          |                  |
|-----------------|--------------------------|--------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>        | <b>Child key</b>         | <b>Role name</b> |
| Primary key     | GENERAL_COM<br>PONENT_ID | GENERAL_COM<br>PONENT_ID | ----             |

**User-defined variables**

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

Relationship  
'ABSTRACT\_COMPONENTMAINTENANCE\_ACTION\_REQUIRES\_COMPONENT'

|                          |   |                    |     |
|--------------------------|---|--------------------|-----|
| <b>Relationship name</b> | ABSTRACT_COMPONENTMAINTENANCE_ACTION_REQUIRES_CO<br>MPONENT |                    |     |
| <b>Relationship type</b> | identifying   | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_COMPONENT   |                    |     |
| <b>Child entity</b>      | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT               |                    |     |

**Partiality**

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | optional  |

**Referential integrity**

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | CASCADE       | CASCADE       |
| <b>Child</b>  | NONE          | NONE          | ----          |

**Keys**

|                 |                          |                          |                  |
|-----------------|--------------------------|--------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>        | <b>Child key</b>         | <b>Role name</b> |
| Primary key     | GENERAL_COM<br>PONENT_ID | GENERAL_COM<br>PONENT_ID | ----             |

**User-defined variables**

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'COMPONENTCOMPONENT\_INSTALLATION\_RECORD'

|                          |  |                    |     |
|--------------------------|--|--------------------|-----|
| <b>Relationship name</b> | COMPONENTCOMPONENT_INSTALLATION_RECORD |                    |     |
| <b>Relationship type</b> | informative                            | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | COMPONENT                              |                    |     |
| <b>Child entity</b>      | COMPONENT_INSTALLATION_RECORD          |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | optional  |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | CASCADE       | CASCADE       |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | COMPONENT_I<br>D  | ???              | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'COMPONENTCOMPONENT\_INSTALLATION\_RECORD1'

|                          |   |                    |     |
|--------------------------|---|--------------------|-----|
| <b>Relationship name</b> | COMPONENTCOMPONENT_INSTALLATION_RECORD1 |                    |     |
| <b>Relationship type</b> | informative                             | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | COMPONENT                               |                    |     |
| <b>Child entity</b>      | COMPONENT_INSTALLATION_RECORD           |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | optional  |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | CASCADE       | CASCADE       |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | COMPONENT_I<br>D  | ???              | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship

'MAINTENANCE\_ACTIONMAINTENANCE\_ACTION\_REQUIRES\_COMPONENT'

|                          |   |                    |     |
|--------------------------|---|--------------------|-----|
| <b>Relationship name</b> | MAINTENANCE_ACTIONMAINTENANCE_ACTION_REQUIRES_COMPONENT |                    |     |
| <b>Relationship type</b> | identifying   | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | MAINTENANCE_ACTION                                      |                    |     |
| <b>Child entity</b>      | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT           |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | optional  |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | CASCADE       | CASCADE       |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                       |                       |                  |
|-----------------|-----------------------|-----------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>     | <b>Child key</b>      | <b>Role name</b> |
| Primary key     | MAINTENANCE_ACTION_ID | MAINTENANCE_ACTION_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship106'

|                          |                                |                    |     |
|--------------------------|--------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship106                |                    |     |
| <b>Relationship type</b> | identifying                    | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_COMPONENT              |                    |     |
| <b>Child entity</b>      | GEN_COMPONENT_STATE_DESCRIPTOR |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                      |                      |                  |
|-----------------|----------------------|----------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>    | <b>Child key</b>     | <b>Role name</b> |
| Primary key     | GENERAL_COMPONENT_ID | GENERAL_COMPONENT_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship107'

|                          |                                |                    |     |
|--------------------------|--------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship107                |                    |     |
| <b>Relationship type</b> | identifying                    | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | STATE_DESCRIPTOR               |                    |     |
| <b>Child entity</b>      | GEN_COMPONENT_STATE_DESCRIPTOR |                    |     |

**Partiality**

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

**Referential integrity**

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

**Keys**

|                 |                     |                     |                  |
|-----------------|---------------------|---------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>   | <b>Child key</b>    | <b>Role name</b> |
| Primary key     | STATE_DESCRIPTOR_ID | STATE_DESCRIPTOR_ID | ----             |

**User-defined variables**

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship112'

|                          |                               |                    |     |
|--------------------------|-------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship112               |                    |     |
| <b>Relationship type</b> | identifying                   | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | USAGE_PERIOD                  |                    |     |
| <b>Child entity</b>      | USAGE_PERIOD_STATE_DESCRIPTOR |                    |     |

**Partiality**

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

**Referential integrity**

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

**Keys**

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | USAGE_PERIOD_ID   | USAGE_PERIOD_ID  | ----             |

**User-defined variables**

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship113'

|                          |                               |                    |     |
|--------------------------|-------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship113               |                    |     |
| <b>Relationship type</b> | identifying                   | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | STATE_DESCRIPTOR              |                    |     |
| <b>Child entity</b>      | USAGE_PERIOD_STATE_DESCRIPTOR |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                     |                     |                  |
|-----------------|---------------------|---------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>   | <b>Child key</b>    | <b>Role name</b> |
| Primary key     | STATE_DESCRIPTOR_ID | STATE_DESCRIPTOR_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship115'

|                          |                 |                    |     |
|--------------------------|-----------------|--------------------|-----|
| <b>Relationship name</b> | Relationship115 |                    |     |
| <b>Relationship type</b> | non-identifying | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | END_ITEM        |                    |     |
| <b>Child entity</b>      | AIRCRAFT        |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | END_ITEM_ID       | END_ITEM_ID      | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship116'

|                          |                            |                    |     |
|--------------------------|----------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship116            |                    |     |
| <b>Relationship type</b> | identifying                | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_MAINTENANCE_PERSON |                    |     |
| <b>Child entity</b>      | MAINTENANCE_PERSON         |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                           |                           |                  |
|-----------------|---------------------------|---------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>         | <b>Child key</b>          | <b>Role name</b> |
| Primary key     | GEN_MAINTENANCE_PERSON_ID | GEN_MAINTENANCE_PERSON_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship117'

|                          |                                 |                    |     |
|--------------------------|---------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship117                 |                    |     |
| <b>Relationship type</b> | identifying                     | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_MAINTENANCE_PERSON      |                    |     |
| <b>Child entity</b>      | GEN_MAINT_ACTION_REQ GEN PERSON |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                           |                           |                  |
|-----------------|---------------------------|---------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>         | <b>Child key</b>          | <b>Role name</b> |
| Primary key     | GEN_MAINTENANCE_PERSON_ID | GEN_MAINTENANCE_PERSON_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |



## Relationship 'Relationship119'

|                          |                            |                    |     |
|--------------------------|----------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship119            |                    |     |
| <b>Relationship type</b> | identifying                | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_MAINTENANCE_ACTION |                    |     |
| <b>Child entity</b>      | GEN_MAINT_REQ_PUBLICATION  |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                                       |                                       |                  |
|-----------------|---------------------------------------|---------------------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>                     | <b>Child key</b>                      | <b>Role name</b> |
| Primary key     | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship120'

|                          |                           |                    |     |
|--------------------------|---------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship120           |                    |     |
| <b>Relationship type</b> | identifying               | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | PUBLICATION               |                    |     |
| <b>Child entity</b>      | GEN_MAINT_REQ_PUBLICATION |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                    |                    |                  |
|-----------------|--------------------|--------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>  | <b>Child key</b>   | <b>Role name</b> |
| Primary key     | PUBLICATION_I<br>D | PUBLICATION_I<br>D | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship23'

|                          |                                      |                    |     |
|--------------------------|--------------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship23                       |                    |     |
| <b>Relationship type</b> | identifying                          | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | FAILURE                              |                    |     |
| <b>Child entity</b>      | MAINTENANCE_ACTION_ADDRESSES_FAILURE |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | FAILURE_ID        | FAILURE_ID       | ----             |
|                 | COMPONENT_ID      | COMPONENT_ID     | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship24'

|                          |                                      |                    |     |
|--------------------------|--------------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship24                       |                    |     |
| <b>Relationship type</b> | identifying                          | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | MAINTENANCE_ACTION                   |                    |     |
| <b>Child entity</b>      | MAINTENANCE_ACTION_ADDRESSES_FAILURE |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                       |                       |                  |
|-----------------|-----------------------|-----------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>     | <b>Child key</b>      | <b>Role name</b> |
| Primary key     | MAINTENANCE_ACTION_ID | MAINTENANCE_ACTION_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship26'

|                          |                            |                    |     |
|--------------------------|----------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship26             |                    |     |
| <b>Relationship type</b> | identifying                | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | MAINTENANCE_ACTION         |                    |     |
| <b>Child entity</b>      | MAINT_ACTION_INVOLVES_COMP |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                           |                           |                  |
|-----------------|---------------------------|---------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>         | <b>Child key</b>          | <b>Role name</b> |
| Primary key     | MAINTENANCE_<br>ACTION_ID | MAINTENANCE_<br>ACTION_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship28'

|                          |                              |                    |     |
|--------------------------|------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship28               |                    |     |
| <b>Relationship type</b> | identifying                  | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | MAINTENANCE_ACTION           |                    |     |
| <b>Child entity</b>      | MAINT_ACTION_INVOLVES_PERSON |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                           |                           |                  |
|-----------------|---------------------------|---------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>         | <b>Child key</b>          | <b>Role name</b> |
| Primary key     | MAINTENANCE_<br>ACTION_ID | MAINTENANCE_<br>ACTION_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship40'

|                          |                              |                    |     |
|--------------------------|------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship40               |                    |     |
| <b>Relationship type</b> | identifying                  | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | MAINTENANCE_PERSON           |                    |     |
| <b>Child entity</b>      | MAINT_ACTION_INVOLVES_PERSON |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                           |                           |                  |
|-----------------|---------------------------|---------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>         | <b>Child key</b>          | <b>Role name</b> |
| Primary key     | MAINTENANCE_PERSON_ID     | MAINTENANCE_PERSON_ID     | ----             |
|                 | GEN_MAINTENANCE_PERSON_ID | GEN_MAINTENANCE_PERSON_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship51'

|                          |                                |                    |     |
|--------------------------|--------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship51                 |                    |     |
| <b>Relationship type</b> | identifying                    | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_MAINTENANCE_ACTION     |                    |     |
| <b>Child entity</b>      | MAINT_ACTION_REQ_GEN_COMPONENT |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                               |                               |                  |
|-----------------|-------------------------------|-------------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>             | <b>Child key</b>              | <b>Role name</b> |
| Primary key     | GENERAL_MAINTENANCE_ACTION_ID | GENERAL_MAINTENANCE_ACTION_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship52'

|                          |                                |                    |     |
|--------------------------|--------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship52                 |                    |     |
| <b>Relationship type</b> | identifying                    | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_COMPONENT              |                    |     |
| <b>Child entity</b>      | MAINT_ACTION_REQ_GEN_COMPONENT |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                          |                          |                  |
|-----------------|--------------------------|--------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>        | <b>Child key</b>         | <b>Role name</b> |
| Primary key     | GENERAL_COM<br>PONENT_ID | GENERAL_COM<br>PONENT_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship64'

|                          |                 |                    |     |
|--------------------------|-----------------|--------------------|-----|
| <b>Relationship name</b> | Relationship64  |                    |     |
| <b>Relationship type</b> | non-identifying | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | UNIT            |                    |     |
| <b>Child entity</b>      | COMPONENT       |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | UIC               | UIC              | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship65'

|                          |                 |                    |     |
|--------------------------|-----------------|--------------------|-----|
| <b>Relationship name</b> | Relationship65  |                    |     |
| <b>Relationship type</b> | non-identifying | <b>Cardinality</b> | 1:1 |
| <b>Parent entity</b>     | COMPONENT       |                    |     |
| <b>Child entity</b>      | END_ITEM        |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | COMPONENT_ID      | COMPONENT_ID     | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship66'

|                          |                            |                    |     |
|--------------------------|----------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship66             |                    |     |
| <b>Relationship type</b> | identifying                | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | COMPONENT                  |                    |     |
| <b>Child entity</b>      | MAINT_ACTION_INVOLVES_COMP |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | COMPONENT_ID      | COMPONENT_ID     | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship67'

|                          |   |                    |     |
|--------------------------|---|--------------------|-----|
| <b>Relationship name</b> | Relationship67                                |                    |     |
| <b>Relationship type</b> | informative                                   | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | MAINTENANCE_ACTION_REQUIRES_GENERAL_COMPONENT |                    |     |
| <b>Child entity</b>      | COMPONENT                                     |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                       |                  |                  |
|-----------------|-----------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>     | <b>Child key</b> | <b>Role name</b> |
| Primary key     | MAINTENANCE_ACTION_ID | ???              | ----             |
|                 | GENERAL_COMPONENT_ID  | ???              | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship69'

|                          |  |                    |     |
|--------------------------|--|--------------------|-----|
| <b>Relationship name</b> | Relationship69                             |                    |     |
| <b>Relationship type</b> | identifying                                | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_MAINTENANCE_ACTION                 |                    |     |
| <b>Child entity</b>      | FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                               |                               |                  |
|-----------------|-------------------------------|-------------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>             | <b>Child key</b>              | <b>Role name</b> |
| Primary key     | GENERAL_MAINTENANCE_ACTION_ID | GENERAL_MAINTENANCE_ACTION_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship70'

|                          |  |                    |     |
|--------------------------|--|--------------------|-----|
| <b>Relationship name</b> | Relationship70                             |                    |     |
| <b>Relationship type</b> | identifying                                | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | FAILURE_MODE                               |                    |     |
| <b>Child entity</b>      | FAILURE_MODE_REQUIRES_GENERAL_MAINT_ACTION |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | FAILURE_MODE_ID   | FAILURE_MODE_ID  | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship71'

|                          |                 |                    |     |
|--------------------------|-----------------|--------------------|-----|
| <b>Relationship name</b> | Relationship71  |                    |     |
| <b>Relationship type</b> | non-identifying | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | FAILURE_MODE    |                    |     |
| <b>Child entity</b>      | FAILURE         |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | FAILURE_MODE_ID   | FAILURE_MODE_ID  | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |



## Relationship 'Relationship73'

|                          |                 |                    |     |
|--------------------------|-----------------|--------------------|-----|
| <b>Relationship name</b> | Relationship73  |                    |     |
| <b>Relationship type</b> | non-identifying | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | END_ITEM        |                    |     |
| <b>Child entity</b>      | USAGE_PERIOD    |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | END_ITEM_ID       | END_ITEM_ID      | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship78'

|                          |                   |                    |     |
|--------------------------|-------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship78    |                    |     |
| <b>Relationship type</b> | non-identifying   | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_COMPONENT |                    |     |
| <b>Child entity</b>      | FAILURE_MODE      |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                      |                      |                  |
|-----------------|----------------------|----------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>    | <b>Child key</b>     | <b>Role name</b> |
| Primary key     | GENERAL_COMPONENT_ID | GENERAL_COMPONENT_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship82'

|                          |                     |                    |     |
|--------------------------|---------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship82      |                    |     |
| <b>Relationship type</b> | identifying         | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | REGIME              |                    |     |
| <b>Child entity</b>      | USAGE_PERIOD_REGIME |                    |     |

**Partiality**

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

**Referential integrity**

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

**Keys**

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | REGIME_ID         | REGIME_ID        | ----             |

**User-defined variables**

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship84'

|                          |                |                    |     |
|--------------------------|----------------|--------------------|-----|
| <b>Relationship name</b> | Relationship84 |                    |     |
| <b>Relationship type</b> | identifying    | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | COMPONENT      |                    |     |
| <b>Child entity</b>      | FAILURE        |                    |     |

**Partiality**

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

**Referential integrity**

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

**Keys**

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | COMPONENT_ID      | COMPONENT_ID     | ----             |

**User-defined variables**

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship85'

|                          |                            |                    |     |
|--------------------------|----------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship85             |                    |     |
| <b>Relationship type</b> | identifying                | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_MAINTENANCE_ACTION |                    |     |
| <b>Child entity</b>      | GEN_MAINT_REQ_TOOL         |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                                       |                                       |                  |
|-----------------|---------------------------------------|---------------------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>                     | <b>Child key</b>                      | <b>Role name</b> |
| Primary key     | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship86'

|                          |                                 |                    |     |
|--------------------------|---------------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship86                  |                    |     |
| <b>Relationship type</b> | identifying                     | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_MAINTENANCE_ACTION      |                    |     |
| <b>Child entity</b>      | GEN_MAINT ACTION_REQ GEN PERSON |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                                       |                                       |                  |
|-----------------|---------------------------------------|---------------------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>                     | <b>Child key</b>                      | <b>Role name</b> |
| Primary key     | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship87'

|                          |                     |                    |     |
|--------------------------|---------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship87      |                    |     |
| <b>Relationship type</b> | identifying         | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | USAGE_PERIOD        |                    |     |
| <b>Child entity</b>      | USAGE_PERIOD_REGIME |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | USAGE_PERIOD_ID   | USAGE_PERIOD_ID  | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship90'

|                          |                        |                    |     |
|--------------------------|------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship90         |                    |     |
| <b>Relationship type</b> | identifying            | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | COMPONENT              |                    |     |
| <b>Child entity</b>      | GEN_COMP_REQ GEN_MAINT |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | COMPONENT_ID      | COMPONENT_ID     | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship91'

|                          |                            |                    |     |
|--------------------------|----------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship91             |                    |     |
| <b>Relationship type</b> | identifying                | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_MAINTENANCE_ACTION |                    |     |
| <b>Child entity</b>      | GEN_COMP_REQ_GEN_MAINT     |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                                       |                                       |                  |
|-----------------|---------------------------------------|---------------------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>                     | <b>Child key</b>                      | <b>Role name</b> |
| Primary key     | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship92'

|                          |                             |                    |     |
|--------------------------|-----------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship92              |                    |     |
| <b>Relationship type</b> | identifying                 | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_COMPONENT           |                    |     |
| <b>Child entity</b>      | GEN_COMPONENT_REQ_GEN_MAINT |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                          |                          |                  |
|-----------------|--------------------------|--------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>        | <b>Child key</b>         | <b>Role name</b> |
| Primary key     | GENERAL_COM<br>PONENT_ID | GENERAL_COM<br>PONENT_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship94'

|                          |                             |                    |     |
|--------------------------|-----------------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship94              |                    |     |
| <b>Relationship type</b> | identifying                 | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | GENERAL_MAINTENANCE_ACTION  |                    |     |
| <b>Child entity</b>      | GEN_COMPONENT_REQ_GEN_MAINT |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                                       |                                       |                  |
|-----------------|---------------------------------------|---------------------------------------|------------------|
| <b>Key type</b> | <b>Parent key</b>                     | <b>Child key</b>                      | <b>Role name</b> |
| Primary key     | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | GENERAL_MAIN<br>TENANCE_ACTI<br>ON_ID | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'Relationship97'

|                          |                   |                    |     |
|--------------------------|-------------------|--------------------|-----|
| <b>Relationship name</b> | Relationship97    |                    |     |
| <b>Relationship type</b> | non-identifying   | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | MANUFACTURER      |                    |     |
| <b>Child entity</b>      | GENERAL_COMPONENT |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | mandatory |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | RESTRICT      | RESTRICT      |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | CAGE              | CAGE             | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

## Relationship 'TOOLMAINTENANCE\_ACTION\_REQUIRES\_TOOL'

|                          |                                      |                    |     |
|--------------------------|--------------------------------------|--------------------|-----|
| <b>Relationship name</b> | TOOLMAINTENANCE_ACTION_REQUIRES_TOOL |                    |     |
| <b>Relationship type</b> | identifying                          | <b>Cardinality</b> | 1:N |
| <b>Parent entity</b>     | TOOL                                 |                    |     |
| <b>Child entity</b>      | GEN_MAINT_REQ_TOOL                   |                    |     |

## Partiality

|               |           |
|---------------|-----------|
| <b>Parent</b> | mandatory |
| <b>Child</b>  | optional  |

## Referential integrity

|               |               |               |               |
|---------------|---------------|---------------|---------------|
|               | <b>Insert</b> | <b>Update</b> | <b>Delete</b> |
| <b>Parent</b> | ----          | CASCADE       | CASCADE       |
| <b>Child</b>  | NONE          | NONE          | ----          |

## Keys

|                 |                   |                  |                  |
|-----------------|-------------------|------------------|------------------|
| <b>Key type</b> | <b>Parent key</b> | <b>Child key</b> | <b>Role name</b> |
| Primary key     | TOOL_ID           | TOOL_ID          | ----             |

## User-defined variables

|  |              |
|--|--------------|
| <b>Name</b>                              | <b>Value</b> |
| Referential Integrity Deferrable         | No           |
| Referential Integrity Initially Deferred | No           |

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